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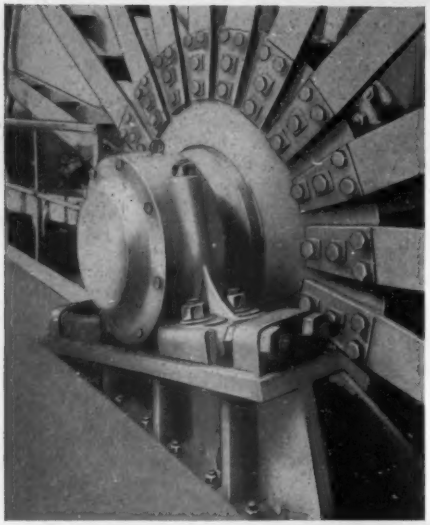

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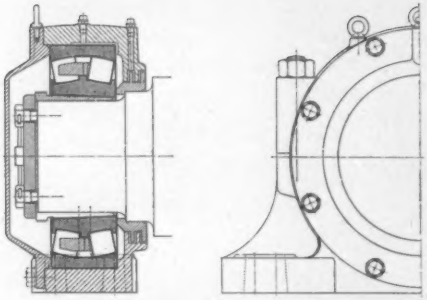

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IRON AND COAL
TRADES REVIEW

Vol. 180 June 3, 1960 No. 4,794

Capital Investment

IN the British economy the rate of overall investment is perhaps not the most important criterion. The real question that arises when there is a limited amount of funds available for enhancing the United Kingdom's production capacity is the quality of investment itself. Consequently, there is seen to be a need to prune investment in the declining industries, especially where money is likely to prove increasingly less productive, and make the funds available through normal commercial channels for injection in the dynamic industries which are taking full advantage of the scope offered in the present technological advance.

In the United Kingdom the focus of post-war investment has centred on several industries, the most conspicuous of which have been iron and steel, chemicals (including petro-chemicals), petroleum refining, and motor vehicles. Atomic energy and aircraft development have also received a significant share. The importance of non-ferrous metallurgy has yet to be fully appreciated.

In the export field the important problems in the '60s are to discover the successful industrial runners for the '70s, accurately to evaluate the utility of current research, to display courage in abandoning any line of inquiry that is unlikely eventually to prove commercially profitable, and to become thoroughly conversant with the lessons derived from technical change. On this score the private sector in the UK has not been far out in its assessment, and performance compares favourably with developments in the USA and USSR.

Progress in the steel industry has been distinctly encouraging. Investment totalled about £50,000,000 (equivalent to £200,000,000 at contemporary prices) during the period 1934-1939. By the end of 1959 capital assets of the industry reached a figure in excess of £900,000,000 of which about £660,000,000 had been invested since 1951. A further £125,000,000 is scheduled for the current year. During the last decade and a half the capacity of industry at about 25,000,000 tons has doubled.

Another industry that has made remarkable progress is petroleum refining. Rising from 2,500,000 tons in 1938 the contemporary figure is 42,700,000 tons, and following completion of new facilities at Milford Haven should shortly approach the 50,000,000 mark, providing at once a considerable saving on foreign exchange and a surplus of petroleum products for export. Over £300,000,000 has been invested in new facilities, making the UK a leading refiner in Europe.

Chemicals have shown a spectacular advance, particularly in the petro-chemical field. Plastics such as PVC, polyethylene, polysyrene, and the newer products such polypropylene, find ready application in domestic and industrial applications. They combine a number of properties which would seem to ensure a broadening coverage in the home and oversea markets. Combining lightness with strength they provide useful components in commercial plant, equipment, and appliances, and, due to resistance to chemical attack, find applications that are frequently closed to conventional materials. Synthetic fibres (either cellulosic or synthetic polymer) such as rayon, courtelle, nylon, and terylene, have sustained marked progress in competition with the natural products. Considerable success has also been experienced with synthetic rubbers.

The inception of the era in metallurgy has drawn attention to the importance of a whole range of metals that were of little more than academic importance a year or so ago. These metals have in varying degrees favourable weight/strength ratio, good performance at high temperatures, and ability to withstand corrosion, fatigue, and even nuclear radiation. Boron, vanadium, zirconium, titanium, niobium, tantalum, nickel, beryllium, and germanium are a few of the many metals that are available, and each possesses its own list of properties invaluable to industry. Thus, metallic borides are used in rocket caps and special dies, niobium as a stabilizing material in the manufacture of special stainless steels, tantalum for tubes and containers for the chemical industry, beryllium for canning nuclear fuel elements, germanium for rectifiers in electronics, and so on. New alloys improve the efficiency of machines in which they are incorporated, and permit radial modification in design. While much has been accomplished in this field, care should be taken through continuous research and investment to ensure that Britain does not fall behind its principal competitors on the Continent, in Asia, and in the Western hemisphere.

When it is considered that motor vehicles alone account for about three fifths of the increase in Western Europe's exports of engineering goods to North America and for a substantial part of British exports to that region—together with jet engines and aircraft—the importance of this branch of industry is immediately realized. Expansion programmes of the leading companies are being announced almost daily. Expenditure on new

plant and equipment, etc., would seem to be running at well over £75,000,000 per annum.

In no field have there been such radical changes as in the aircraft industry, and difficulties have been experienced in adapting available resources to the rapidity of change. The vertical take off aircraft, the supersonic air liner, and the popularity of the missile have stressed both the desirability of Governmental aid on sociological grounds and the need for joint research programmes. Arising out of this the prospect of Anglo-French, and perhaps Anglo-German, aeronautical co-operation has much to commend it. By this policy the burden of essential research may be shared, while joint participation will enable Britain to keep abreast of the swift passage of events.

Perhaps another field of enterprise deserves attention—namely, the peaceful uses of atomic energy. Clearly much public money has been devoted to the establishment of the Calder Hall nuclear power station, and much more will be required to maintain Britain's pre-eminence in this line of inquiry. The advanced gas-cooled, the high-temperature, and the fast breeder reactor systems are all under active study in the United Kingdom. The first represents our next step in the field of nuclear power generation, followed by one or the other in later years, depending on the success of contemporary research.

Several conclusions may be epitomized: —

1.—Today more than ever before Britain must be prepared to spend more on research and productive investment. This may to some extent be shared with others. In 1958 British industry spent £300,000,000 on scientific research and development.

2.—Broad industrial associations are recommended either with firms in the United Kingdom or with oversea concerns interested in the same subject matter of inquiry. A comprehensive and integrated and industrial structure is best equipped to discharge current research and to undertake large-scale investment profitably.

3.—A system of priorities should be arranged to ensure that the maximum use is made of the monies available. This should be established by industry itself, aided from time to time by Government agencies should special factors supervene.

4.—An attempt should be made to recruit new resources of capital, particularly to interest the man in the street in the need to give the maximum encouragement to British enterprise in its drive to out-rival oversea competitors.

5.—Apart from the development of suitable machines and appliances, more attention should be given to market research to determine what can be sold, where it can best be disposed of, and how best to do it.

Passing Thoughts . . .

EVERY colliery organization is trying to reduce production and stocks to equate supply with demand but never in the history of the European coal industry has such equilibrium been possible. The industry will lumber on past the point of balance into a comparative seller's market.—MR. JOHN A. RAVEN, director of the British Coal Exporters' Federation, writing in The Guardian.

There are those who say that the Coal Board could have got rid of the coal at "bargain prices," and saved the cost of stocking. Ridiculous.—Sheffield Telegraph.

If the coal industry is to retain an important place in meeting national energy requirements the public cannot be satisfied with it as it is. . . . More thought will have to be given to the contribution that can be made to the industry and less to what can be got out of it.—Scotsman.

Encouragingly the National Coal Board has admitted for the first time that its troubles can be solved only by hard selling.—Glasgow Herald.

The Coal Board is plainly convinced that it would be unwise to adopt the policy its critics have advocated and dispose of the bulk of the stock at bargain prices to a deserving British public.—Yorkshire Post.

Opinion is unshaken that good use will yet be made at home of the coal in stock, and of all that can be won economically for the next 20 years.—Newcastle-upon-Tyne Journal.

With prospects of cheaper and more plentiful oil from new sources, such as the Soviet Union and the Sahara, and the need for still further increases in output per man to keep down the price of coal, there remains strong reason to doubt whether the [Coal] Board is really aiming for the right degree of contraction of both output and manpower.—Daily Telegraph.

The Coal Board now clearly believes that it has passed the worst point in its stocking problem and it is prepared to take a tough line with its critics.—Financial Times.

We've no time for the hard-faced men who would criticize Sir James Bowman, chief of the Coal Board, for making a deficit by stockpiling coal. It was worth the money to prevent a national outrage.—Daily Herald.

Lacking the enormous natural resources enjoyed by Russia and the United States we must concentrate particularly on making the best use of intellectual raw material.—Glasgow Herald.

The proposal for general mechanical training for unemployed juveniles is worth exploring. Despite the need for expanding ordinary and technical education, a training scheme should be devised to prevent social waste and industrial frustration.—The Scotsman.

But who "wins" a strike? Whatever the outcome, families lose wages, industry loses production, and companies lose orders.—The Guardian.

The stoppage of production, whether by lockout or by strike, is an archaic and out-moded method of settling disputes.—MR. P. G. CARDEW, president of the British Federation of Master Printers.

INTERNATIONAL FOUNDRY congress in Vienna next year will be organized by the Austrian foundry association, Verein der Giessereinfachleute.

BMEEA Constituted

MINING MACHINERY INDUSTRY'S VENTURE

FORMAL constitution has now taken place of the British Mining Equipment Export Association. With a present membership of 33 firms, the association has been formed to tackle the industry's problems with regard to government and financial agencies both at home and oversea and to provide facilities for collective market intelligence and sales promotion. It is pointed out that although the export market for mining equipment is increasing, organized competition from other industrialized countries is severe—especially from the US, Germany, France, Japan, and Russia.

During the past two or three years mining machinery manufacturers in the UK have become particularly aware of the contraction of the coal-mining industry in this country and the fact that many established oversea markets for British equipment have now become self-supporting for many items of equipment or no longer regard this country as their natural supplier.

However, rising population trends and living standards, as well as other indicators, point with certainty to the continued expansion over the long term of every branch of mining.

Opportunities Available

In the light of an estimate made by economists in 1958 that new investment at the rate of more than £2,000,000,000 per annum would be needed merely to take account of the prospective rise in mineral consumption, market opportunities are such that no manufacturer can afford to overlook them. Most of these opportunities, however, are in the underdeveloped countries who look to the industrial powers for the provision of finance and technical aid.

The association feels that the difficulty experienced by the UK mining machinery manufacturer in obtaining his proper share of the oversea market is not a question of the men or the know-how being non-existent. It is because in many areas of the world it is virtually impossible to practise as a consulting mining geologist or engineer on an unsubsidized basis and the facilities in Britain for such subsidies, whether from Government, financial institutions, or from the industry itself, are not forthcoming. The association feels, therefore, that it is essential that British consultancy know-how should be made available at a competitive cost and at the earliest possible stage in the consideration of all new exploration or mining projects.

Because of the difficulties and problems attached to active and profitable participation in the oversea market, some degree of co-operative effort seems inescapable, particularly if selling costs are to be kept down. For that reason the mining machinery industry would find it expedient to undertake or put in hand collective market intelligence and sales promotion activities.

Speaking at a Press conference on Monday, both Mr. C. R. C. Burton (International Combustion (Export), Limited), chairman of the association, and Mr. A. H. Bull (Oldham & Son, Limited), drew attention to the severe oversea competition, particularly from the US and Germany, and said that the industry must act as one if the climate for oversea sales was to be improved.

It is estimated that upwards of 450 British firms export mining and ancillary equipment worth £40,000,000 annually and of these the association has contacted some 130. The subscription has been fixed on a sliding scale—from £100 to £500 per annum on a basis of export turnover in mining equipment.

Mr. D. G. Hemmant, managing director of Powell Duffryn Technical Services, Limited, has been seconded from the company for 12 months to be acting director of BMEEA. Mr. J. W. Law is honorary secretary and in addition to those mentioned, the following are members of the committee:—Mr. R. L. Aitken (M. B. Wild & Company, Limited); J. R. Bingham (Joy-Sullivan, Limited); Mr. B. A. Higgins (Mining Engineering Company, Limited); H. Langford Holt (Dowty Mining Equipment, Limited); L. W. Needham (Head Wrightson Colliery Engineering, Limited); D. F. Stewart (Victor Products, Limited), and Mr. U. Baliol Scott (Mining Journal). The association's headquarters are at Boundary House, 7/17, Jewry Street, London, E.C.3 (telephone: ROYal 0141).

Joy-Sullivan Names New Regional Distributors

NEW local distributors are announced for the range of rotary portable air compressors, rock drills, and other pneumatic equipment manufactured by the air power division of Joy-Sullivan, Limited, of Greenock. They are:—

A. Gunn & Company, Limited, of Altrincham (Ches), for the north-west counties; Sanplant (Derby), Limited, for the Midlands; and M.Q.C. (Equipment), Limited, of Bath and Cardiff, for the south-west. These distributors will give exclusive local sales and servicing facilities as well as the direct technical assistance offered by Joy-Sullivan.

Industrial Output Climbs

FURTHER rise in industrial output was made in April. The provisional official estimate for the month puts the industrial production index at the peak level of 120-21, compared with 119 for the previous three months. The average for February to April was 120—2 per cent. higher than in the previous three months and 11 per cent. above a year earlier.

Chief reason for the expansion is that more sections of heavy industry are now experiencing an increase in orders and production.

President of Scottish Branch of the NACM

SCOTTISH branch of the National Association of Colliery Managers has for its new president, Mr. William Duncan, mechanization engineer of No. 4 (Central East) Area of the Scottish Divisional Coal Board.

MR. WILLIAM DUNCAN

Mr. Duncan, who is a Glaswegian, was born in 1904 and received his technical education at the Lauder Technical College, Dunfermline, and Heriot Watt College, Edinburgh. He came south over the border into Northumberland to start his mining career and since 1928 has held a number of managerial posts in Britain and Australia.

He has been a member of the Scottish Council for many years and is keenly interested not only in the technical but also the social activities of the NACM.

Clean Air Need Not Cause Colliery Unemployment

"IT is time we dismissed this myth that miners will be out of work if we go on to the use of smokeless fuels," said Mr. Irving Fieldhouse, public health inspector for Darton Urban District, speaking at a meeting of Barnsley and District Clean Air Committee on Thursday of last week. Mr. Fieldhouse pointed out that smokeless fuels were derived from coal. It took 30 cwt. of coal to make a ton of smokeless fuel and he could not see where the unemployment was coming from.

Cllr. Harry Wilkinson thought that while miners' concessionary coal was burned in the district they would never have clean air. "If we can solve the difficulty of the difference between the concessionary coal and solid smokeless fuels without it being a burden on the miner himself, we shall have solved our major problem, he said.

Mine Rats are not Barometers

BELIEF held by many miners that rats from nearby farmland go underground in bad weather has been exploded by the Minister of Power's Safety in Mines Research Establishment, Sheffield. Drift mines are mostly affected and Sheffield University Zoology Department has studied closely conditions in a Yorkshire drift mine.

A survey of 562 mines by one of the department's research workers has shown that more men in the pit means more rats and the belief has been reduced to a matter of "good housekeeping." Badly-kept surface buildings and food left lying about above or below ground encourage the rats to breed and infect mine workings—fair or foul weather.

Lack of Progress in Marketing of Coal

THE coal industry would not be kept dominant by "the hand of providence" but only by good management and good planning, said Mr. J. C. George, Parliamentary Secretary to the Ministry of Power, last Friday, at the annual dinner of the Midland Institute of Mining Engineers at Sheffield.

He said that coal had reigned unchallenged as the main source of power in Britain for a long time, but things were now changing. It was staggering to find that a product which was in demand for so long was no longer so much required, but it might not be a bad thing that the industry was now free from the need to produce every ton of coal which could be won.

"There is now opportunity to see if we have made progress. I do not think that technically we have made sufficient progress. Certainly on the marketing side we have made none at all."

Other speakers at the dinner were Mr. R. G. Baker, deputy chairman, North-Eastern Divisional Coal Board; Prof. F. S. Atkinson, president of the institute, Prof. J. T. Whetton, vice-president, and Mr. G. E. Currier, deputy chairman, North-Eastern Gas Board.

Variation in Mines Ventilation Regulations

REGULATION 7 (5) of the Coal and Other Mines (Ventilation) Regulations, 1956, provides that determinations of firedamp content required to be made in mines of coal, stratified ironstone, shale, or fireclay, once in every week or 30 days must be made at the appropriate stage of the mining operations on the last working day of the week, other than a Saturday, on which the operations comprise that stage.

These regulations implement the recommendation of the report on the explosion at Walton Colliery last year by varying the 1956 regulations so that such determinations may be made at any time during the shift commencing on a Friday and ending on the Saturday if the appropriate stage of the operation occurs at that time.

The Minister of Power proposes that the new regulations should come into force on August 1. They are now issued in draft form.

MINISTER AND NEW SCOTTISH COLLIERY

VISIT to Scotland's newest colliery, Bilston Glen (Midlothian), was paid by the Minister of Power, Mr. Richard Wood, on Tuesday. After inspecting the surface installations he spent an hour underground. Mr. Wood said the colliery was due to start operating next year when 100,000 tons of coal would be produced. This would rise to 1,000,000 tons a year in four or five years. Mr. Wood was accompanied by Mr. R. W. Parker, chairman of the Scottish Divisional Coal Board, Mr. G. R. Buchan, Lothians Area general manager, and Mr. W. Russell, the manager of Bilston Glen Colliery.

Mr. Alex Moffat, vice-president of the Scottish Area of the National Union of Mineworkers, refused to meet the Minister because he objected to the arrangements made for the welcoming party.

CUT-PRICE RUSSIAN COAL

"Ridiculous" Price of 51s. a Ton

INCURSION of the Soviet Union into the field of cut-price coal in the export market was reported by Mr. R. H. E. Thomas, marketing and supplies member of the National Coal Board, when the board's report and accounts for 1959 were presented at a Press conference on Tuesday. Russian coal, he said, was being delivered at the "ridiculous" price of 51s. a ton to a Danish power station. A summary of the report is given on page 1257.

The Russian coal, said Mr. Thomas, had to be transported 2,250 miles from Russian pits to a Polish port, thence by sea to Denmark and allowing, say, 10s. to 15s. a ton as the cost of rail freight and about 6s. a ton sea freight, this would put Russian production costs at 30s. a ton.

British exports of coal, expected to be about 5,000,000 tons this year against 4,300,000 tons last year, are being sold at a loss to the NCB of about 28s. a ton, which is the limit to which the board apparently is prepared to go and this means an export price of about 55s. a ton.

Saving in Unemployment Benefit

Presenting the report, the chairman, Sir James Bowman, said that the board's policies must have saved many millions of pounds in unemployment benefit. The annual report, purely from its financial aspects, looked bad, but looked at against "terrific tasks," against a background of rising productivity and efficiency, it had many bright spots.

Last year, he said, almost every group of customers used less coal than in 1958. The board took its decision to stock its surplus output on the basis of a cold realistic assessment of the cost against the consequences of every possible alternative. "We are already being proved right. The consumption of coal this year has already stopped falling.

"If we had taken the drastic steps constantly pressed on us for short time working, to double the number of closures and therefore set up heavy unemployment, we should have destroyed the sense of confidence in the industry. We could well have destroyed the future of the British coal industry," he maintained.

"This year we should start the first stock lift and having brought production under control it is simply a question of looking forward to ensure year by year the stock lift continues."

Long-term Planning for Coal is Needed

PREPARATION of plans for the coal industry with the next 100 years in mind was urged by Mr. J. A. Bullock, president of the British Association of Colliery Management, at its annual conference at Folkestone last Friday.

"Let us look at the whole problem of coal utilization," he said. "We should make our plans now, so that we can really promise full employment to the nation in the knowledge that money otherwise paid out on the dole will be employed in creating a national fuel policy in which coal is regarded as a precious chemical, and our only source of production capable of bringing an enhanced standard of living to the nation."

Mr. Bullock, method study engineer for the No. 8 Area of the North-Eastern Divisional Coal Board, said that gasification of coal at the pits and a national gas grid system would go a long way towards making the coal industry so efficient that oil would no longer be the danger it was.

Savings in breakage, transport, marketing and all the various agencies employed to get the coal to the consumer could be made if there were a drive to gasify coal at source. By siting coal processing and gasification plants near the centres of the eight major coalfields in Great Britain, the coal transport problem could be much reduced.

The chemical industry, he said, was on the fringe of big developments—almost all founded on coal. Coal processing, with its by-products providing the needs of a virile and expanding chemical industry, could give desperately needed exports of great value.

Repairs to Shaft Head Completed in 36 Hours

JOURNALS of one of the headgear pulley shafts at No. 2 shaft of Michael Colliery (Fife) were recently reground *in situ* in 36 hours. Service engineers of Nicol & Andrew, Limited, Hillington, Glasgow, working in close co-operation with colliery technicians, had to slacken the winding rope to fit the grinding head on to the journals.

Working 150 ft. above the ground they ground and honed the parts to an accuracy of .001 in. Because they worked round the clock the job was finished six hours within the time limit of 42 hours, during a holiday period, and the gear was thoroughly tested before being commissioned again.

Companies' Agreement with Atomic Energy Authority

COLLABORATION and licence agreements were signed last Friday between the UK Atomic Energy Authority and two chemical engineering companies—W. J. Fraser & Company, Limited, Romford (Essex), and Nuclear Chemical Plant, Limited.

The agreements will help British industry to compete for export trade in the design and manufacture of radioactive chemical processing plant. They are the first of their kind since the authority's decision in 1957 to collaborate with members of the British Chemical Plant Manufacturers' Association, which desired to enter the nuclear chemical field.

Personal

Mr. H. K. WOOLSEY, chief electrician at the steelworks of Richard Thomas & Baldwins, Limited, has been elected chairman of Irthlingborough (Northants) UDC.

Mr. JAMES F. WHITTLESTONE, a colliery deputy, who for the past 13 years has been superintendent of the Barnsley division of the St. John's Ambulance Brigade, is to be made a Serving Brother of the Order.

After 49 years with the Lancashire Steel Corporation, Limited, Mr. HARRY PERRIN, chief engineer, has retired. He began his career in the drawing office and was appointed chief engineer after the war.

Mr. H. R. BRUNYEE, at present works manager (services) at the Steel, Peech & Tozer branch of the United Steel Companies, Limited, is to retire on July 31. He will be succeeded by Mr. M. THOMAS, who is at present assistant works manager (services).

At the annual meeting of the Foundry Coke Merchants' Association held in London on Thursday of last week Mr. J. WILLIAM BELL (Renwick, Wilton & Dobson, Limited) was re-elected chairman and Mr. E. TASKER, (Darby & Company (Birmingham), Limited) vice-chairman.

MR. C. E. T. CRIDLAND has been appointed chairman of the Transport Users' Consultative Committee for the West Midlands Area. Mr. Cridland is chairman of a number of companies including Chisholm, Gray & Company, Limited, Aero Heat Treatments, Limited, and Hard Coating, Limited.

LORD HIVES, first chairman of the National Council for Technological Awards and a former chairman of Rolls Royce, Limited, received the first honorary diploma in technology (engineering) from Sir Harold Roxbee Cox, deputy chairman of the Metal Box Company, Limited, and the present chairman of the council, on Thursday of last week.

Estates general manager of the North-Eastern Divisional Coal Board, Mr. J. W. RIDYARD, has been elected chairman of the Yorkshire branch of the Royal Institution of Chartered Surveyors. Chairman of the adjoining Northumberland and Durham branch of the RICS is Mr. NORMAN R. PALMER, assistant chief surveyor of the Durham Divisional Coal Board.

Mr. HENRY DEAR, commercial sales manager of Taskers of Andover (1932), Limited, agricultural engineers, retired recently. He joined the firm as an apprentice in 1905 and took up his last appointment in 1949. Mr. F. W. Knight, general sales manager, made a presentation on behalf of the company to mark the occasion. Mr. R. SWINBANK succeeds Mr. Dear as home sales manager.

Councils of Manchester University and the Manchester College of Science and Technology have approved the appointment of Mr. W. JOHNSON, to the Chair of Mechanical Engineering in the Faculty of Technology, in succession to Prof. H. Wright Baker, who is to retire in September. Mr. Johnson was appointed Senior Lecturer in Mechanical Engineering at the university in 1956.

Sir John Charrington's successor as chairman of the Chamber of Coal Traders has been announced as Mr. DOUGLAS CORY-WRIGHT. He began his business career in 1922 with William Cory & Son, Limited, and was made a director in 1938 and deputy chairman in 1951. A member of the Industrial Coal Consumers' Council for some years, he was appointed its deputy chairman in 1956. He was chairman of the Coal Trade Benevolent Association in 1957.

Among those nominated to serve on a committee of 20 to be appointed to consider reorganizing the North-East Industrial and Development Association in order to make it more effective in attracting new industries to the area are the following:—Mr. J. G. WRIGHT, Wright Anderson & Company, Limited, Mr. T. KIRKUP, executive director, British Periclase Company, Limited, and Dr. WILLIAM REID, chairman of the Durham Divisional Coal Board.

Dr. E. S. HEDGES, director of the International Tin Research Council, is making an extended tour of the Continent for a number of conferences devoted to organotin compounds. After visiting the offices of the ITRC in Düsseldorf, he will go on to Bonn, Frankfurt, and Marienberg before visited Basel in Switzerland and Vaduz (Liechtenstein). Dr. Hedges' tour includes a visit to Vienna and on his return he will call at the council's Italian office in Milan.

Joint managing director of Grayson, Rollo & Clover Docks, Limited, Liverpool, Mr. R. F. COPLEY, has been inducted as president of the Liverpool Engineering Society. Mr. Copley began his career in the engineering works of Fawcett, Preston & Company, Limited, Liverpool. He later served as engineering manager of the Liverpool shiprepairing and engineering concern, R. & J. Evans & Company, Limited, an associate company of Grayson, Rollo & Clover Docks.

Recent Wills

LLEWELLYN, MAJOR BRIAN, mining engineer, of Tavistock (Devon) £29,972

BRAY, HARRY, principal of H. Bray & Sons, scrap metal merchants, of Holmfirth (Yorks) £13,030

CHUBB, H. E., former chairman of Chubb & Sons' Lock & Safe Company, Limited, London, W.1 ... £108,513

MCDONALD, H. T., stores controller for the Hereford-Fishguard area for Wagon Repairs, Limited ... £1,876

HUGHES, J. L., iron and brass founder, carrying on business under the style of Ben Hughes, Loughor (Glam) £119,464

LOMAS-WALKER, SIR BERNARD, chairman of Cresswell's Asbestos Company, Limited, Bradford, and a director of a number of other companies £23,412

HYSLOP, R. M., director of Bayliss, Jones & Bayliss, Limited, makers of railway fastenings, upset and hammer forgings, etc., of Wolverhampton £33,218

GREEN, MAJOR G. H., chairman of Eliza Tinsley & Company, Limited, manufacturers of chains and builders' ironwork, of Old Hill (Staffs), and a past president of the Edge Tool Manufacturers' Association £119,463

TAYLOR, T. L., for many years a leading figure in the engineering industry, one time chairman of Taylor Bros. & Company, Limited, steelmakers, etc., of Manchester, and president of Yorkshire County Cricket Club £241,639

SIMON-CARVES, LIMITED

IN our report in last week's issue of the details of the proposed merger of Henry Simon (Holdings), Limited, and Simon-Carves, Limited, a sub-heading stated that Lord Simon of Wythenshawe is to be chairman of the new group, Simon Engineering, Limited.

As was correctly stated in the following text, Lord Simon has consented to be president of Simon Engineering and the chairman of the new group is to be Mr. R. B. Potter. We much regret this unfortunate oversight.

REPLY of the Engineering and Allied Employers' National Federation to the claim for pay increases for apprentices, youths, and boys in general engineering will be given at a meeting with the Confederation of Shipbuilding and Engineering Unions in London on June 15.

Law Cases

BOLT AND NUT PACT

"Agreement Gives Stability and Confidence"

FURTHER tributes to the service and quality given by members of the Black Bolt and Nut Association have been paid in the Restrictive Practices Court, which has considered whether the association's agreement which contains price-fixing arrangements is contrary to public interest. Mr. L. R. Conway, sales director of Godwin Warren & Company, Limited, Bristol, and chairman of the National Association of Bolt and Nut Stockholders, maintained that the agreement not only created stability but reduced stockholders' costs.

Mr. F. Lord, a member of the central council of the association said that price arrangements tended to prevent an early rise in prices as soon as costs increased. Asked whether there was any reason why research should not continue and the association remain in being if price-fixing went, Mr. Lord said: "If the price arrangement goes and we have more severe competition than at present there will be no margin of profit in the industry to spend money on research."

Mr. A. E. Bullough, director and secretary of John Bullough, Limited, manufacturers of bolts and nuts, of Atherton (Lancs), said the agreement had created stability in the industry and given confidence to firms like his to invest in new machinery.

£100,000 on Research

In cross-examination Mr. A. J. W. Reynolds, general manager of a Sheffield firm of bolt and nut manufacturers and a member of the association's technical and research committee, estimated that about £100,000 a year was spent on research by manufacturers in the industry. If there were no price agreement each firm would have to experiment on its own without the co-operation of other members. If more money had to be spent on research production costs would go up.

During the course of his cross-examination, Mr. M. H. Tullit, chairman of Guest Keen & Nettlefolds (Midlands), Limited, was asked if an inferior article could not be produced within the British Standards specification. Mr. Tullit agreed, but added: "My company could not do that. I would rather lose money than do that." He asked: "Do you think it is in the public interest to produce shoddy goods? Anything that is not of good quality is shoddy."

Evidence from the economics point of view was given by Mr. G. D. C. Worswick, a Fellow and tutor in Economics at Magdalen College, Oxford, who said that although it was difficult to say whether the introduction of an agreement in 1933 had any connection with the subsequent improvement in quality and the rise in investment in new plant and machinery, it appeared that the rate of investment in the bolt industry after 1933 was more than the average for manufacturing industry.

In his closing speech for the Registrar, Mr. Peter Foster, QC, maintained the association had not proved that, so far as the price-fixing arrangements were concerned, the basis of computation was correct or that the prices charged were in fact fair and reasonable. The prices were "wholly arbitrary" because of the wide spread of the profit shown. The Registrar did not say that the target profit of 10 or 12½ per cent. was unreasonable nor did he say the average actual profit of members of the association was unreasonable, but he did say the spread of profit was very high.

Mr. Foster said that the prices charged might be reasonable now, but there was nothing to prevent them being unreasonable at any time in the future. If the price list went there might follow competition in prices and it might be that for a period uneconomic prices might be charged. That state could not exist for very long because if a manufacturer was charging consistently uneconomic prices he must inevitably go out of business. No benefit to the public so far as price stability was concerned had been made out by the association.

Concluding the case for the association, Mr. B. J. MacKenna, QC, suggested that the reason the Registrar had not called a manufacturer or stockholder to give evidence was that everybody was perfectly satisfied with the arrangements under the agreement. The provisions of the 1956 Act showed that it was accepted by Parliament that in some circumstances an agreement in an organized industry might be of benefit to the public rather than unrestricted freedom.

On Tuesday—the final day of the hearing—Mr. MacKenna for the association said he did not contend that mere stability in price, without regard to other matters, could be of benefit to the public. A price stabilized at an exorbitant level would be obviously detrimental, but if the price was stabilized at a reasonable level and prevented from both rising and falling, the stability achieved might be beneficial to the market.

Mr. MacKenna said that because of the agreement, the trade had "the advantage of knowing that so many people are selling at the same price," and that it was unnecessary for the trade to incur the expense of "shopping around," which he understood from the evidence, to be by no means a negligible one.

He submitted seven points had been made:— The industry was not responsive to changes in price and the product must be produced and stocked in a very large number of different varieties; before 1933 the industry had been acutely depressed; there had been a wonderful improvement since 1933; the standard of service was high; during the period of the agreement there had been a spirit of co-operation shown in the substantial volume of inter-trading, exchange of technical information, and projects of joint research;

selling prices had been fixed at a reasonable level; the effect of the association's policy had been to achieve price stability.

The court is to consider its judgment which is to be announced later.

"Know-how" Income Not Taxable

JUDGMENT of some importance to manufacturing firms has been secured by Rolls-Royce, Limited, in the Chancery Division. Mr. Justice Pennycuick found that payments to the company by foreign governments or companies for "know-how" arose from the sale of a capital asset and are excluded from the computation of the company's profits.

He dismissed with costs four appeals by the Crown against decisions of the Special Commissioners allowing appeals by Rolls-Royce against assessments to income tax, excess profits tax, profits tax, and excess profits levy arising from the sale of technical knowledge. The appeals concerned assessments on the company's profits amounting to more than £15,000,000 for the years 1948 to 1955.

The judge said that with one or two exceptions Rolls-Royce did not turn its "know-how" to account until after 1945 except within its own manufacturing trade. Then between 1946 and 1953 the company entered into, with foreign governments and companies, a number of agreements, the basic provision of which was that, in consideration of a lump sum payment, the company would supply drawings and information to enable the other party to manufacture specified types of aero-engines.

The company had contended that it had never been its policy to make inventions and discover secret processes with a view to earning profits by realizing its rights in the inventions or processes. The vast store of knowledge and secret information was a fixed capital asset. The judge said he thought the transactions represented a disposition of part of the company's capital assets and it followed that any payment made in respect of it was not to be brought into account in computing revenue profits.

USE OF PROTECTIVE CLOTHING

PROTECTIVE clothing supplied by Nuffield Metal Products, Limited, Birmingham, was the subject of an appeal heard before Lord Justice Sellers in the Court of Appeal. Mr. Roy William Henry Wilson had been awarded £205 damages at Birmingham County Court for a wrist injury, the county court judge finding that the employers, knowing that protective armlets provided were not being worn by all workmen because the elastic was too tight, should have done something about it.

Lord Justice Sellers, allowing the company's appeal against the judgment, said that the company had spared no expense in providing protective clothing for its employees. He could find no negligence on its part. Mr. Wilson or any other workman could have adjusted the armlet to meet his particular requirements.

Nuffield Metal Products spent £30,000 a year in providing protective clothing. Workmen were issued with a fresh pair of gloves daily. Armlets were renewed weekly for 3,000 workers.

Agreeing, Lord Justice Willmer said the company issued a booklet to all employees in which they were advised to use the safety equipment provided. It had been said that workers should have been ordered to use the armlets. His Lordship thought such a course would have resulted in serious damage to labour relations.

MINER FOUND NOT GUILTY

ACCUSED of getting off an underground train at Kiveton Park Colliery while it was still moving 22-year-old miner, Mr. Alexander Moffet Meechan, was found Not Guilty by Rotherham magistrates. Prosecuting, Mr. Harry W. Dunk said it might not appear terribly serious that a man should get off a train that was just crawling to a standstill, but there were 150 to 160 men riding on the train going to the pit bottom to come out of the mine.

"There is quite a rush—almost a stampede—to get off the train and to the pit bottom. The men are not allowed to run but they walk extremely quickly and if anybody falls down it is very difficult to get up again," he said.

Evidence for the defence stated that the train was not moving when Meechan got off it.

John Summers' Trading Profit Increase

TRADING profit for the 26 weeks to April 2, 1960, of John Summers & Sons, Limited, steelmakers, of Shotton (Ches), was £7,150,000, compared with £6,900,000 for the first 27 weeks of 1958-59, and with £13,436,122 for the full 53 weeks ended October 3, 1959.

The company is maintaining its interim at 6 per cent., as forecast, on capital increased by a 50 per cent. scrip issue, representing an effective rise of 2 per cent.

Demand for sheets and light plates from a wide range of consuming industries continues to expand, states the interim report, and commitments for the rest of the financial year already absorb the full expected production of the Shotton works. Improved demand for heavy steel products is enabling the works to operate at a higher level this year.

Capital Boost for Steel Project in New Zealand

APPLICATION to increase its authorized and subscribed capital to £1,650,000 from the present £50,000 has been made by the Pacific Steel Company, Limited, Auckland, New Zealand. A 40-acre site for a merchant bar steel mill near Auckland is already in preparation by the company, and the erection of an electric furnace plant and a steel rolling mill will begin in the next few months. Production is expected to start towards the end of next year.

Of the increased authorized capital, oversea companies will hold £660,000, with New Zealand companies holding the balance. Principal oversea equity shareholders are Colvilles, Limited, Stewarts and Lloyds, Limited, and Guest, Keen & Nettlefolds, Limited, each holding £220,000. Biggest shareholder is the Fletcher Trust & Investment Company, of Auckland, with £440,000.

Record for South Wales

FIRST PROFIT ON INLAND COAL SALES ALONE

FOR the first time in its history the South-Western Divisional Coal Board made a profit on an inland basis of sales alone. The divisional chairman, Mr. D. M. Rees, announces that there was a profit of £375,909 for the year—the more noteworthy in that it was effected in spite of the stocking of 1,604,223 tons of coal during the year and there being no surplus proceeds from exports to supplement the results. But for these two factors the year would have registered a substantially bigger profit.

Increased efficiency, Mr. Rees continues, is indicated by a comparison with 1947 when output per manshift was as low as 15.9 cwt. for the division. By 1959 it had risen to 20.5 cwt., an increase of 28.9 per cent.—the highest figure of overall productivity ever recorded for South Wales. Much of the improvement has been effected by the growth of power loading and by the end of 1959 there were 89 installations at work, one fifth of the South-Western division's output being obtained by this means.

The better trend in industrial disputes was maintained during the year, but there was still a loss of 182,000 tons from this cause. Rates of absenteeism showed no improvement—rather the reverse—and were again extremely high in post-holiday periods.

Ample Employment Assured

Total output dropped by 2,122,079 tons to 20,452,148 tons and the manpower declined by 7,274 to 92,181, the reduction levelling off on the last quarter of the year. Juvenile recruitment increased and net recruitment for the first quarter of 1960 was considerably better than for the corresponding period a year ago. In particular there was a large number of re-entrants, but the general beneficial effect was obscured by the agreed retirement of almost 3,000 men aged 65 and over.

The situation now presented, Mr. Rees states, is that more men are urgently required at specific locations within the division for the many developments that are being carried out to increase output to between 24,000,000 and 26,000,000 tons by 1965. "Today ample opportunities of permanent employment are assured under the requirements of the Revised Plan for Coal," says Mr. Rees.

The board, he continues, has very positive faith in the South Wales coalfield. Its special coals provide specialized services, and no other source of fuel and power can compete on an economic basis with the position which the South Wales coalfield holds in relation to all the industries in and around the coalfield. With an expanding economy, the requirements of those industries will be far greater in the immediate years ahead.

On the broader economic front South Wales is best equipped for the purposes of the coal export trade.

The chairman makes the following references to the various Areas in the division:—No. 1 (Swansea) incurred a loss of £969,752 (£714,361) due mainly to the time lag until collieries build up outputs. Productivity improved to 19.78 (18.97) cwt. No. 9 (Neath) Area presented the biggest and most persistent problem. Total loss (£2,866,156) was much the same as in 1958, but the loss per ton was higher owing to lower output. O.m.s. improved to 15.42 (14.90) cwt.

No. 2 (Maesteg) again registered a profit (£676,150) and o.m.s. increased to 21.55 (20.94) cwt. Profit of No. 3 (Rhondda) Area at £186,770 was an increase and o.m.s. went up to 19.88 (18.92) cwt. The highly-remunerative No. 4 (Aberdare) Area again showed a profit—of £1,696,000 and higher o.m.s. of 22.88 (21.83) cwt.

No. 5 (Rhymney) again made a profit (£411,001) and o.m.s. increased to 20.80 (20.33) cwt. No. 6 (Monmouthshire) reversed the 1958 loss of about £500,000 to a profit of almost £500,000 and o.m.s. was up to 21.21 (20.05) cwt.

Only three collieries are now working in the Forest of Dean Group and, owing to a marked reduction in working costs, the loss was down to £298,669 (£503,039) or 14s. 8d. (20s. 11d.) per ton. The o.m.s. increased to 19.55 (17.09) cwt. The Somerset and Bristol Group also reduced its loss to £338,834 (£484,516). The position was now stable and prospects good if manpower was satisfactorily maintained. There was a spectacular improvement in o.m.s. from 20.17 cwt. to 23.05 cwt.

Scottish Miners Want Early Settlement of Claims

DELEGATES at a conference of the Scottish Area of the National Union of Mineworkers at Rothesay on Wednesday unanimously approved a resolution which said that they were perturbed at the long delay in settling their claim for a seven-hour day and a pay increase.

The meeting heard Mr. Abe Moffat, president of the Scottish miners, call for "unity like that demonstrated by the railwaymen" in support of the miners' pay and hours claim. Their weekly wages had been reduced over the last two years, said Mr. Moffat, while day-wage workers had received no increase for 21 months despite the rise in productivity.

Mr. Moffat said it was more than four years since the Sankey Commission promised a seven-hour day. If this was not conceded, the miners would have no alternative but to take action.

It was announced in London on Wednesday that the NUM claim for an increase of 12s. a week for 300,000 day-wage men will go to the arbitration tribunal on June 24.

Electronics in the Steel Industry

FUTURE of electronics in the steel industry would be intimately related to the introduction of automation, said Mr. W. E. Davies, of the Steel Company of Wales, Limited, speaking at a conference on electronics in industry held in connection with the Instruments, Electronics, and Automation Exhibition in London, last week. "Automation is going to be introduced slowly with a time scale stretching to decades. The process will be brought about in steps. Each one will be nursed to reliability in turn until finally a stage will be reached when the whole will be computer controlled," he said.

Emphasizing flexibility as the great advantage of electronics, Mr. Davies said it was first necessary to breed a feeling of confidence in the operators. The need for co-operation between makers of electronic equipment and the users was essential and designers of equipment must be told of the conditions under which their apparatus was to operate and the difficulties of maintenance.

One of the electronic applications to steelmaking was in the rapid analysis of molten metal which could now be carried out in three minutes. This was particularly important since the introduction of the Bessemer furnace, the tap-to-tap time of which was 20 minutes, compared with the eight hours of the open-hearth furnace. The instant when the Bessemer furnace must be tapped became less dependent on human experience and must rely more and more on fast analysis of the molten steel.

Another field in which electronics were widely used was in the application of gauges to measure thicknesses and widths, said Mr. Davies. To be of any real value a gauge must be 100 per cent. accurate. A width gauge for instance would enable the factor of safety in the width of rolled metal to be reduced from 1½ in. to 1 in. But if the gauge were faulty and a single coil of steel produced underwidth that coil would be considered scrap and to make up the loss 100 or more coils would have to be rolled accurately. For this reason some form of internal calibration of the instrument must be provided.

Five Prime Causes of Industrial Accidents

IF industry made a determined and systematic onslaught on the Big Five the totals could be made to show a sharp drop, said the Minister of Labour, Mr. Edward Heath, speaking at Scarborough last Friday. He was not referring to the banking concerns but to the Big Five prime causes of most accidents in industry. Those causes were, he said, handling goods, people falling, being struck by falling objects, stepping on or striking against objects, and accidents with hand tools.

Mr. Heath was addressing the conference of the Industrial Safety Division of the Royal Society for the Prevention of Accidents at which the Sir George Earle Trophy for the most outstanding contribution to industrial safety was presented to Mr. R. H. S. Turner, works manager and a director, on behalf of Associated Electrical Industries (Manchester), Limited.

CHERRY TREE MACHINE COMPANY, LIMITED—Mr. J. Mackrell, a member of the board, has been appointed commercial director.

French Steel Firms Plan Mergers

PERMISSION has been granted by the High Authority of the European Coal and Steel Community for the French steel concern, Haut Fourneaux de la Chiers, of Longwy-Bas to take over the Hautes-Rivières forging concern, Etablissements Schenmetzer. The authority also announces that the request by the French USINOR group to take over the share capital of the Dunkirk steel plant, Société Dunkerquoise de Sidérurgie is not subject to ECSC conditions and the merger does not, therefore, require authority consent.

The planned fusion of the Italian steel companies, Cornigliano and Ilva, can also take place without authority permission. The state holding concern, Finsider owns 60 per cent. of Cornigliano shares and 65 per cent. of Ilva shares. Latest annual output figures show a combined total of 2,900,000 metric tons of raw steel and 1,460,000 tons of rolled steel products.

According to the bulletin of the financial consortium of the French steel industry, Groupement de l'Industrie Sidérurgique, French annual capacity will be between 22,000,000 and 23,000,000 tons by 1965. Present annual capacity is about 16,500,000 tons. The GIS also states that home demand for commercial steel qualities (except for boiler plates) this year will be 9 per cent. above the 1959 level. Inland sales of quality and refined steels are expected to be 25 per cent. higher than during last year's recession.

About 3,040,000 tons of cast iron was produced in Western Germany last year, against 2,840,000 tons in 1958, and 3,060,000 tons the year before. Output of malleable iron castings last year was a record at 187,600 (178,000) tons. Since 1936 production of malleable iron castings has risen by 114 per cent., but that of cast iron by only 31 per cent. Orders in hand exceed current production levels.

Steel Firm Recruitment Will Cramp College

FURTHER recruitment of young people by Samuel Fox & Company, Limited, of Sheffield, will mean that Stocksbridge College of Further Education must either expand or cut its programme before next September. This was stated at last week's meeting of the West Riding of Yorkshire Education Committee.

The Policy and Finance Sub-committee reported that most of the students already there were employees of the firm, which had just announced a further £4,500,000 development scheme, and was planning to recruit more young people from Stocksbridge and district. A number of additional courses had been planned, but the influx was expected to be so great that the present building would be too small.

The county education officer, Mr. A. B. Clegg, suggested that a maximum of £20,000 should be allocated for this need. This would enable two classrooms to be provided at a cost of £3,750 and make an initial instalment of £16,250 for the current financial year for the new college which was contemplated. These suggestions, approved by the sub-committee, were confirmed by the full committee.

A NEW DRIFT at Broomhill Colliery to work high-grade coking coal in the Victoria Seam is to be opened by the Durham Divisional Coal Board.

In Parliament

FORMER COLLIERY COMPANIES

Crown Will Meet Litigation Costs

CONCESSIONARY " costs " are to be paid by the Government to liquidated colliery companies which will be debarred under the Finance Bill from reclaiming tax from the Ministry of Power. SIR REGINALD MANNINGHAM-BULLER, the Attorney-General, said that the various companies had been right to issue writs under the law as it was discovered to be following the case in which the former Whitworth Park Coal Company, Limited, had successfully reclaimed tax.

He went on: " It would not be unreasonable to pay the costs incurred in this litigation up to Budget Day by the companies concerned—costs which, had they been successful, they might have been expected to recover." Bearing in mind that these actions might not have been successful, he hoped it would be thought that this was very fair treatment by the Crown.

Earlier, the Attorney-General said that no injustice had been suffered by the colliery companies because the Ministry of Fuel and Power, in making the payments, followed a practice which had been followed for years, by deducting tax at the standard rate. Asking whether this matter should in future be dealt with in relation to the Crown, Sir Reginald said it was extremely unlikely that the same situation would arise.

" Nothing Unusual "

" There is nothing unusual or wrong, in my submission, in making the law accord with what everyone has for years thought it to be and in accordance with which people have acted without the slightest complaint. The colliery companies knew perfectly well that tax was being deducted at source. They never complained about that. At that time it made no difference to their liability." Sir Reginald said that if the clause were not passed the only advantage which might arise for the colliery companies was that they had issued writs which might or might not succeed.

SIR KENNETH PICKTHORN (Con.), who had moved an amendment (later withdrawn), said that colliery companies were entitled to take the preliminary steps by the due course of law up to that moment and it must clearly be necessary that the expense incurred should be put right. " I think that perhaps we have carried this far enough to make it plain that there are many of us who think that this sort of thing should be looked at a great deal more carefully," he declared. " I very much regret that the Government does not find it possible to say that they will legislate in a definite way so that this shall not happen again."

Necessary Imports of Sheet Steel

INCREASED cost of importing sheet steel during the first quarter of 1960, compared with the first quarter of 1959 was £8,000,000 on an increased quantity of 110,000 tons. The quantity was 355 per cent. above last year's figure. This reply was given by MR. JOHN C. GEORGE, Parliamentary Secretary to the Ministry of Power in reply to a question by Mr. Frederick Lee (Lab.).

MR. LEE thought the nation was passing into a most serious situation. " We are now suffering from some inefficiency within the industry in its lack of effort to expand the production of sheet and we are now reaching a situation in which the balance of payments' position is threatened by our inability to get sufficient sheet steel in Britain."

MR. GEORGE could not agree. Between the first quarter of last year and this, net deliveries of sheet steel from UK sources had increased—not decreased—by 26 per cent., or 146,000 tons, the bulk going to home consumers. Home consumption increased by 176,000 tons, or 32 per cent. and demand by even more as consumers built up stocks they had run down in the previous quarter. For the moment, said Mr. George, imports were inevitable to sustain industrial demand. The present level of production was rising at a rate of 250,000 tons, annually.

He went on to tell Mr. Lee that actual increased capacity rose by 250,000 tons to 2,250,000 tons in 1958 and again in 1959 to 2,500,000 tons. This year it was expected to reach 2,750,000 tons and next year 3,000,000 tons. There would be imports this year and next year. Thereafter production was expected to meet demand and in the years following substantially to exceed demand.

RESEARCH EXPENDITURE

MORE questions about the amounts spent by industry on research and advertising were put by MR. DOUGLAS JAY (Lab.). He asked, in the first instance, how much of the £300,000,000 spent by industry in 1958 on research and development was out of public funds, and how much was for research and how much for development.

SIR DAVID ECCLES, Minister of Education, said that exact figures were not available but a little more than half this sum was out of public funds. It was not possible, he added, to make an apportionment between research and development.

Mr. Jay asked whether it was realized that this meant that industry was spending out of its own funds three times the amount on advertising as on research. Sir David said he had no responsibility for the advertising expenditure of industry, but added that an important change had taken place in recent years,

both in the total amount spent on research and the amount of that total supported by private funds.

A "MINER" ERROR

THERE are no underground mines in Basutoland. This was how MR. C. J. M. ALPORT, Minister of State for Commonwealth Relations, opened his reply to a question by MR. JAMES DEMPSEY (Lab.) about the employment of 13-year-old children as underground miners in Basutoland.

Mr. Alport said that a 13-year-old Basuto boy had been featured in the Daily Herald as an underground miner. The boy had been questioned and had been found to be 18 years old. He had never been underground and had been employed on planting tree seedlings in one of the parks, and washing dishes. The boy was wearing a miner's helmet when the photograph was taken and his explanation was: "I borrowed the hat from a friend of mine because it was raining and I did not want to get my head wet."

INDUSTRIAL DISEASES

DISADVANTAGES suffered by miners who were examined before entering the industry and declared fit but after 10 years suffered pulmonary disability were stressed by DR. BARNETT STROSS (Lab.). They were not entitled to benefit in the same way as cotton operatives who contracted byssinosis, he said.

MR. J. BOYD-CARPENTER, Minister of Pensions, said he was bound by the Act which laid down that they could deal in this way only with complaints that were a risk of the occupation and were not common to all persons.

NCB MINES CLOSURE

REPLYING to MR. WILLIAM OWEN (Lab. & Co-op.), MR. JOHN C. GEORGE, Parliamentary Secretary to the Ministry of Power, said that 53 NCB mines were closed during 1959. About 15,500 men were affected, of whom about 400 were still out of work.

The 400 were scattered over the country—100 in Scotland, 200 in Northumberland and Cumberland, and 100 in South Wales. No serious problem emerged anywhere. The 6,400 men unemployed represented 1 per cent. of those in the industry.

AS THE MATTER might become the subject of court proceedings, the Minister considered it would be improper to make any further comment on the reasons why a fan belt concerned in the Auchengeich Colliery accident did not conform to BS 2066.—The Parliamentary Secretary to the Ministry of Power replying to Mr. George Darling (Lab. & Co-op.).

WHEN Mr. James Hill (Lab.) asked how many miners in the Scottish coalfields had been supplied with tricycles (invalid cars) and how much it would cost to replace them with two-seater cars, the Secretary of State for Scotland said in a written reply that records were not kept of the occupation of patients supplied with tricycles. He could not, therefore, give an estimate of the cost of replacement.

THE Minister of Housing and Local Government had been informed of seven schemes agreed between Northumberland County Council and the National Coal Board for improving the appearance of spoil heaps, and Ashington UDC had reported agreement with the NCB for the progressive planting of trees. Exchequer assistance was available where the spoil heap was in a development district or in a national park or area of outstanding natural beauty.—Parliamentary Secretary to the Ministry of Housing in a written reply to Mr. William Owen (Lab. & Co-op.).

Orders Placed

Gas from Low-grade Coal

CONTRACT for the construction of a £225,000 pilot plant which is being built to enable the Gas Council to test a new gas-making process which uses low-grade coal has been awarded to Simon-Carves, Limited, Cheadle Heath, Stockport (Ches). Simon-Carves is working in conjunction with Dr. C. Otto & Company, Bochum, West Germany.

The pilot plant is being built at the North Thames Gas Board's works at Bromley (Kent) and is expected to be completed in about a year.

INDIVIDUAL motor starters and contractor pattern lighting control panels for the new Spencer steelworks of Richard Thomas & Baldwins, Limited, are to be supplied by Dewhurst & Partners, Limited, Hounslow (Middx).

GREEK ministries of Industry and Co-ordination have ordered a 376 metric ton per day sulphur-burning sulphuric acid plant from Chemical Construction (GB), Limited. The plant will be built at Ptolemais as part of a large nitrogenous fertilizer factory.

WILLIAM BOBY & COMPANY, LIMITED, water treatment engineers, of Rickmansworth (Herts), has been awarded a contract, valued at £2,500, for base exchange plant for the new boiler house of the North Works of the South Durham Iron & Steel Company, Limited.

CONTRACT for 12 marine auxiliary boilers worth £56,000 from Brodoimpeks, of Belgrade, on behalf of two Yugoslavian shipyards has been placed with Cochran & Company, Annan, Limited, Annan, Scotland. The boilers are for installation in ships to be built for foreign owners.

NEW 12/17 lb. steel capacity vacuum induction furnace for the Permanent Magnet Association is being built by Wild-Barfield Electric Furnaces, Limited, Watford. It will be used primarily for melting in vacuo alloys of aluminium-, nickel-, and cobalt-iron alloys for research into permanent magnet materials.

TWO TUGS are to be equipped by Plenty & Son, Limited, engineers, ironfounders, and manufacturers of marine steam engines, of Newbury (Berks), for the Calcutta Port Trust. A large proportion of the order, which has been placed by the Hooghly Docking & Engineering Company, Limited, and is worth £80,000, will be built in India.

EIGHT LARGE direct current batteries, with mercury arc and selenium rectifier charging equipment are to be supplied by Pritchett & Gold & E.P.S. Company, Limited, accumulator makers, London, S.W.1, as part of the emergency equipment for the Central Electricity Generating Board's 500 mW nuclear power station at Hinkley Point (Soms).

CONTRACT FOR the construction of a 1,200-ft. deep shaft has been awarded by the US Atomic Energy Commission to the American subsidiary of the Cementation, Limited, group. The shaft will provide access to a drivage designed for the detonation of a nuclear device for the development of atomic energy for peaceful purposes. The contract is worth $765,000.

VERDICT of Misadventure was returned at a Lincoln inquest on Friday on Mr. Thomas Spikins (40), a machinist with Robey & Company, Limited, engineers and boilermakers, of Lincoln, who was crushed to death when a half wheel weighing over 4 tons tipped and trapped him.

IRON AND STEEL TRADE

CAN the steelworks keep pace with the rising demand? Production in the first five months of 1960 has considerably exceeded expectations and domestic requirements are still increasing. Exports have increased so rapidly that curtailments are suggested as a temporary expedient and comparisons with European steel quotations are highly favourable. Even the iron-castings trade which has lingered so long in the shadows, achieved an output of more than 1,000,000 tons in the first quarter of the year—a 4½ per cent. improvement on the previous quarter and almost 25 per cent. above the level of a year ago. Now come apparently well-authenticated reports that the Iron and Steel Board and the British Iron and Steel Federation have agreed on a "major increase" in the rate of iron-ore production in the UK.

Pig-iron

The dominating fact in the pig-iron trade is the extreme pressure for more hot metal for the melting shops. The 25 per cent. rise in the output of iron castings in the first quarter of the year has not overtaxed the capacity of the makers of foundry iron, nor has it yet made necessary a contraction in the volume of exports.

Blast furnaces, of course, will be kept in full operation this weekend and will provide a useful addition to steelmakers' reserve stocks of basic iron. But more is needed, since scrap, the only alternative material, is scarce, and maximum tonnages are promptly absorbed.

Ferro-alloys

There has been a further increase in the price of ferro-tungsten which now stands at 11s. 11d. per lb. W. contained, and tungsten metal powder is similarly increased to 14s. 11d. per lb. The demand for ferro-tungsten has increased somewhat, doubtless in anticipation of further price rises. Both the 45 per cent. Si. and 75 per cent. Si. grades of ferro-silicon are well supported, and there is a fair demand for ferro-chrome and calcium silicide. Ferro-manganese is active, and silico-manganese is in moderate request.

Steady attention is given to ferro-niobium and ferro-titanium, while ferro-vanadium and ferro-molybdenum are fairly active. The demand for chromium metal has increased, but silicon metal is quiet.

Semi-finished Steel

The position in regard to supplies of steel semis has not changed. Billet mills are promptly disposing of increased outputs and domestic supplies are supplemented by imports from Western Europe.

Re-rollers, anxious to keep their mills operating at full stretch to satisfy a brisk market for light material, are using small percentages of foreign billets, and steelmakers are making every endeavour to overtake the demand.

Finished Steel

A feature of the finished steel trade is the ever-growing call for steel sheets for the motor industry. The tinplate trade is also very brisk, but wire drawers have struck a dull patch. Heavy steel shapes and sizes are attracting a good deal of attention and to contractors engaged on factory and works extensions, speed of delivery has become an important factor.

There is also in process of development a definite upturn in the demand for plate and the mills are now working closely to capacity limits.

Iron Castings Output Nears Record

STEADY expansion in iron castings production during the second half of 1959 has continued through the first quarter of this year, according to a statement issued by the Joint Iron Council, based on figures calculated by the Iron and Steel Board. Total output of iron castings in the first three months of this year was 1,032,900 tons, compared with 989,200 tons in the last quarter of 1959. This increase of 4½ per cent. raised the production level to within ¼ per cent. of the industry's quarterly record.

An increase is recorded in all industrial sections, except for the building and domestic section which shows a 2.5 per cent. reduction against the previous quarter. Even in this section, however, there is an 11.5 per cent. increase compared with the equivalent quarter last year. In the other categories, the automobile section again improved on its past record of steeply rising output, and the engineering section showed marked advance on the previous quarter.

In this section, machine tool and textile machinery castings gained the most, but chemical and gas plant, and boilers were among the very few products which recorded little improvement. Pressure pipes and fittings output was well maintained at the higher levels established in the second half of 1959, and ingot mould production rose in sympathy with the sustained busier conditions operating in the steel industry. The output of the railway equipment section improved significantly but remained lower than a year ago.

There were 129,500 people employed in the ironfounding industry at the end of March this year. This figure is 2,000 more than that of three months ago and 6,000 more than the figure at the end of March, 1959.

Bristol and London Firms to Co-operate

DIRECTORS of the Metal Agencies Company, Limited, Bristol, and Rownson, Drew & Clydesdale, Limited, merchants and engineers, of London, E.C.4, have made arrangements whereby the two companies will in future work in close co-operation.

Chairman and managing director of Rownson, Drew & Clydesdale, Mr. Bruce Donald, will shortly join the board of Metal Agencies in an executive position. While remaining chairman of Rownson, Drew & Clydesdale, he will give up the position of managing director, which is to be taken over by Mr. W. Douglas.

Non-ferrous Metals

Sharp Reverse for Copper

COPPER in London suffered a sharp reverse last week and prices dropped by a total of £13 12s. 6d. a ton on the news that the copper strikes in Chile had been settled. The price slide began in front of the actual settlement and the market's position was further weakened by the publication of statistics in the US which showed that fabricators' stocks at the end of April showed a rise of 16,000 tons to 457,000 tons on the month and that order-books had declined from 134,500 tons to 111,100 tons during the same period.

After the shake-out, copper in London has developed a firmer undertone this week, in spite of a reduction in the Belgian quotation and a rise in stocks in LME warehouses to 4,038 tons. The improved supply position is reflected in the narrowing of the backwardation to around £2 a ton. In the US a squeeze developed for May metal, otherwise, copper continues to move slowly. The price of 33 cents a pound still applies to both custom smelters and producers.

Tin has been a good market in New York and the price has gone over $1 a pound. Singapore is also firm but the London market inclines dull. This may be partly attributed to the influence of the United Nation's Tin Conference in New York where the draft of a proposed new International Tin Agreement is being discussed. In London stocks continue to increase and at the end of last week totalled 8,388 tons.

Lead has been an irregular market in London mainly because of the expected arrivals of foreign supplies which have made consumers reluctant to do anything more than meet routine commitments. The appearance of a small contango reflects the satisfactory position of prompt metal. In the States the market is good and has been helped by further strikes in the industry and a possibility of more stoppages in the near future. The US price is unchanged at 12 cents a pound.

Zinc is a patchy market in London and, although consumption is at a satisfactory level, the appearance of a small contango points to the adequate availability of prompt metal. The New York market is featureless and the price is still called 13 cents a pound. In Canada the Consolidated Mining & Smelting Company has raised its quotation for Prime Western zinc by ¼ cent to 13 cents a pound.

Official metal prices in London yesterday (Thursday) were:—COPPER, Standard: Prompt £245 5s., forward £242 10s. TIN, Standard: Prompt £785, forward £787. LEAD: Prompt £76, forward £76 10s. ZINC: Prompt £91 15s., forward £91 7s. 6d.

Big Laterite Bed Discovery in Pakistan

DEPOSITS, estimated at 50,000,000 tons, of laterite—a key mineral for the iron and steel industry—have been found in the Ziarat area of the Quetta region of Pakistan. A preliminary geological survey indicated an area of some 500 sq. miles bearing a laterite bed from 2 to 40 ft. thick.

Drilling begins this month and if successful these iron reserves, coupled with good quality iron in the Dalbandhin area in the Quetta region, could give a considerable boost to the development of an iron and steel industry in Pakistan.

European Foundry Apprentice Competition

"THERE are firms who fail to take their responsibilities for training seriously enough, and though they are employers of skilled men, do not make a proper contribution by training to the replenishment of the country's pool of skilled manpower," said Mr. P. J. M. Thomas, Parliamentary Secretary to the Ministry of Labour. He was speaking at the presentation of awards last Friday to entrants in the European Foundry Apprentice Competition.

Mr. Thomas went on to say that no increase in the numbers of technologists and technicians would be of value unless there were the craftsmen available to back them up, though their role might in the future call in smaller measure for manual skills and to a greater extent for technical knowledge, initiative, and adaptability. It was both quality and quantity of training which they must seek to improve and in the last resort the amount of training done and its standard depended on the sense of responsibility of individual firms.

The problem of getting more firms to pull their weight would be of crucial importance in Britain in the next two years as the school-leaving "bulge" affected the employment field. Individual firms must weigh carefully their own efforts in the training field and consider whether there was not more scope for them to increase their investment in the future.

Apprentices from eight countries took part in the competition which was won by France (R. Flahaut, 137.9 marks out of a possible 170). Second and third was Great Britain (C. F. Corbett, 131.9 and T. J. Vincent, 128.5). France also won the team competition, with Britain second and Germany third.

The competition was held at the National Foundry College, Wolverhampton, and at the Wednesbury steelfoundry of F. H. Lloyd & Company, Limited.

Wear Shipyards Get More Orders

ORDER for a 7,000-ton motor-ship for the Indo-China Steam Navigation Company, of Hongkong, placed with Joseph L. Thompson & Sons, Limited, of Sunderland, is the 19th shipbuilding order in Sunderland in as many weeks. Delivery of this vessel is scheduled for the end of 1961.

Already the number of orders at Sunderland so far this year exceeds the total volume of work booked in the whole of 1958 and 1959. A member of the Wear Shipbuilders' Association commented: "It is far too early to say whether the tide is turning in favour of British shipbuilding.

"We are certainly getting plenty of inquiries but orders are as difficult to book as ever. Fortunately we are now gaining the benefit of cheaper building as a result of modernizing our yards and this means that we are in a strong position to meet the challenge of foreign competition."

It is hoped that a new post-war record launching output may be achieved this year by Tyne shipbuilding yards. The best effort since the war was 246,550 tons gross in 1956. When the first half of 1960 ends it is estimated that the yards will have 102,000 tons gross of shipping in the water. Among launches scheduled for the second half of the year are three large vessels which will account for a further 100,000 tons gross.

SIR JOHN CHARRINGTON

SIR JOHN CHARRINGTON

CHAIRMAN of the Chamber of Coal Traders since 1949, Sir John Charrington, one of its founder members, relinquished that position last week. Chairman of Charrington, Gardner, Locket & Company, Limited, since 1940, Sir John, the fourth John Charrington to join the family coal merchanting business of Charrington, Sells, Dale & Company, was educated at Haileybury, and entered the company's service in 1906. During the 1914-18 war he served in France, Salonika, Egypt, and Palestine, returning to the company in 1919.

Since his early days in the firm, and particularly after the second world war, Sir John has been the prime mover in the amalgamations and acquisitions which have brought Charrington, Gardner, Locket & Company, Limited, to its present size and standing. Sir John is one of the leading figures in the coal distributive trade, and has held and still holds many offices connected with trade organizations.

President of the Coal Merchants' Federation of Great Britain from 1930-32 and from 1947-50, Sir John is a past-president of the London Society of Coal Merchants. He has been a vice-president of the Coal Utilization Council since its inception in 1932 and is a vice-president of the British Coal Utilization Research Association. He was largely responsible in the early 1930s for the formation of the Distributors' Branch of the London and Counties Coke Association, of which he has been chairman throughout, and of the London Coke Contractors' Association. Since 1943 he has been chairman of the National Federation of Coke Distributors' Associations. He is a member of the Domestic Coal Consumers' Council and of the Clean Air Council.

Sir John was knighted in 1949 for outstanding services to the coal trade.

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Colliery Managers Elect New President

Mr. H. H. WILSON TAKES OFFICE

MEMBERS of the National Association of Colliery Managers, at their annual meeting at Southport (Lancs) on Wednesday, elected Mr. H. H. Wilson as president of the association for 1960-61. The new president, who is deputy production director (operations) in the Scottish Division of the NCB, is a past president of the association's Scottish Branch. The annual meeting was the prelude to a three-day national coal-mining conference, the theme of which is "The Challenge of Change." The conference, held under the presidency of Mr. H. E. Tyson, ends today (Friday).

The six technical sessions of the conference were devoted to an examination of the National Coal Board's "Revised Plan for Coal" in its many and varied aspects.

The technical and economic implications of the plan were discussed, its social consequences analyzed, its financial aspects explained, and its marketing implications appraised.

Contributors of papers to the conference were:—Mr. H. E. Collins, member for production, National Coal Board; Mr. R. H. E. Thomas, board member for marketing; Mr. J. Crawford, board member for industrial relations; Mr. H. A. Longden, the board's director-general of production; Mr. W. V. Sheppard, director-general of reconstruction, and Mr. A. W. John, director-general of finance.

Sir James Bowman, chairman of the NCB, gives the closing address to the conference this morning.

Mr. H. E. Tyson's presidential address, delivered at the annual meeting on Wednesday, is printed on page 1241.

A full account of the annual meeting and conference will appear in our next issue.

The New President

MR. H. H. WILSON

MR. WILSON brings to the office of president of the National Association of Colliery Managers a wide knowledge of the British coalfields.

A native of Ayrshire, where he received his early mining training, he was educated at Muirkirk Higher Grade School, Kilmarnock Technical School, and the Royal Technical College, Glasgow. After spending some time as assistant to Dr. Winstanley in his early work on roof control, Mr. Wilson joined the Mines Inspectorate, serving as Junior Inspector in the Midlands and Southern Division and later as Senior Inspector in Scotland.

He later joined Mavor & Coulson, Limited, Glasgow, mining machinery manufacturers, etc., and was engaged for some years in the installation of power-loading equipment. He was appointed chief mechanization engineer at the National Coal Board's headquarters in London at the beginning of 1948, transferring to the Scottish Division on similar work on July 1, 1949. He is now deputy production director (operations) in the Scottish Division.

Mr. Wilson has retained a keen interest in safety in mines and represents the NACM on the Safety and Health Committee of the Coal Industry National Consultative Council.

Lagging for Conveyor Drums

A METHOD of lagging conveyor drive drums which will give a 100 per cent. drive in very wet and/or slimy conditions, has been devised by Mr. J. Gibbon, mechanical engineer of the Durham Divisional Coal Board, and Mr. F. Burgon, No. 5 Area mechanization engineer, Durham Division. It has already been adopted widely in the division and is proving very successful, particularly on wet coal faces.

The idea is to mould a lagging of suitably prepared fire-resistant neoprene directly on to the steel case of each drum of any conveyor drive unit. It is necessary for this work to be done by a manufacturer with experience in this field of equipment. After the moulding has been completed the surface of the neoprene is ground down until the required drum diameter is reached, leaving at all times a thickness of at least ¾ in. of neoprene.

A special tool is then applied to the surface to give a patterned tread; in the Durham Division an equal diamond pattern has proved very suitable.

Experience has shown this neoprene lagging to have a life six times greater than any other method used.

New Literature

NEW catalogues, booklets, and other publications which have recently been received include the following, which are acknowledged with thanks.

RENDALE HANDLING, LIMITED, 5, Great Hampton Street, Birmingham 18—Details of the company's "Draggon" marshalling equipment are contained in a new brochure (publication No. RH/126 A). A wide range of colliery equipment is included.

WEST'S GAS IMPROVEMENT COMPANY, LIMITED, Albion Ironworks, Miles Platting, Manchester 10—An article on a new Glover-West plant installed at Bathurst, New South Wales, is a feature of the spring issue of West's Magazine.

TURNER BROS. ASBESTOS COMPANY, LIMITED, Rochdale—Two well-produced catalogues have just been published. BA.73, which deals with conveyor belting, details the wide range of natural and synthetic fibre, rubber-covered, conveyor belts which are available, while BPV.3, concerned with "Poly-V" drives, gives useful engineering data on service factors, horsepower ratings, and pulleys, and installation and maintenance instructions.

MASTABAR MINING EQUIPMENT COMPANY, LIMITED, Avenue Parade, Accrington (Lancs)—The part played by "Comet" equipment in the modernization of Grimethorpe Colliery in No. 4 (Carlton) Area of the North-Eastern Divisional Coal Board is described in the May issue of the Comet Journal.

EVERSHED & VIGNOLES, LIMITED, Acton Lane, London, W.4—Many advanced features are incorporated in the new Series 3 "Megger" instrument which has just been put on the market. They are described in publication No. 327.

INCANDESCENT HEAT COMPANY, LIMITED, Cornwall Road, Smethwick, Birmingham—Leaflet V.61 gives details of the company's radiant-jet furnaces.

HILGER & WATTS, LIMITED, 98, St. Pancras Way, London, N.W.1—Volume VI of "Spectrochemical Abstracts," by Ernest H. S. van Someren and F. Lachman, has now been published, price 25s. The new volume covers the period 1954-55.

GEORGE KENT, LIMITED, Luton (Beds)—An article by I. C. Hutcheon dealing with certain aspects of the electromagnetic flowmeter is included in the April issue of the Instrument Engineer, the magazine published by the company as a contribution to the science and art of industrial instrumentation.

LLOYD'S REGISTER OF SHIPPING, 71, Fenchurch Street, London, E.C.3—"Lloyd's Register of Shipping, 1760-1960," has been specially written for the society's bicentenary by George Blake. It is the story of an enterprise which began 200 years ago in Edward Lloyd's Coffee House in the City of London. The organization has played a notable part in the history of shipping throughout the world and has contributed to its wellbeing in peace and war. Mr. Blake's story encompasses the passing of the wooden ship under sail and the iron ship, the introduction of steam, the steel ship, and the diesel engine, and, now, nuclear power for marine propulsion. The cost of the volume is £2 2s.

STEEL, PEECH & TOZER (BRANCH OF THE UNITED STEEL COMPANIES, LIMITED)—May issue of the Phoenix Gazette contains 40 pages packed with news items and photographs concerning the activities of the company and its employees. The attractive layout and general presentation make the Gazette a monthly works magazine to look forward to.

CONFLOW, LIMITED, Lenton, Nottingham—Details of the Conflow Code 100 auto spray control have now been published in a brochure. The unit was fully described in our issue of March 25. The company has also published a pamphlet on its Code 7 Maxway valve, which is used extensively in mines and industry.

QUASI-ARC, LIMITED, Bilston (Staffs)—Included in the April issue of Welding News is a brochure on the company's Handicool 600 electrode holders, which have recently made their appearance. The magazine contains the first article in what promises to be an interesting series on flux materials.

CHLORIDE ELECTRICAL STORAGE COMPANY, LIMITED, Clifton, Swinton, Manchester—On May 20, Mr. A. W. Browne, chairman of the company, officially opened the new central research and development laboratories of the group at Clifton. A description of the laboratories and an outline of the work to be carried out there are contained in an attractive brochure.

SOCIETE L'AIR LIQUIDE—From France comes a handsome brochure, "Nitrogen and Life," containing articles by experts on the many uses of nitrogen in 20th century life. The contributions are supported by excellent illustrations and first-class colour printing.

New BS for Mines Haulage Rolling Stock

BRITISH Standard for Light and Medium Rolling Stock for Mineral Haulage in Mines (BS 3237:1960), which has recently been published, provides for the design and construction of good quality light and medium rolling stock of up to 60 cub. ft. capacity. The vehicles are of the "pit tub" type. They are primarily intended for mineral haulage in mines, although they may also be of use for mineral haulage elsewhere than in collieries. (It is intended to produce later a similar standard for the heavier "mine car.") Although BS 3237 deals with the complete vehicle, care has been taken to avoid restriction on design. Materials and basic requirements for design and construction are specified for bodies and underframes; but for such components as wheels, axles, and pedestals, and the drawgear hook, the specification goes into greater detail.

The range of sizes of fixed and loose wheels has been greatly reduced as compared with present practice. The standard provides guidance on the design of drawgear components such as shackles, rings, and links; design formulæ are also included. There is a list of information which will help the purchaser when ordering. The new standard will prove a useful addition—from both the manufacturer's and user's viewpoints—to the growing list of British standards on colliery engineering.

Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1 (price 15s.; postage will be charged extra to non-subscribers).

Wide Strip Mills

Latest issue of the technical publication, "Davy-United Engineering," issued by the Davy & United Engineering Company, Limited, Darnall Works, Sheffield 9, features wide strip mills. It is written by M. F. Dowding, director in charge of engineering and sales, C. Sturdy, chief engineer, and A. A. Thomas, engineering sales manager.

NACM President Calls for

A REVISED PLAN FOR SAFETY

Safety, being Everybody's Business, Tends to Become Nobody's Business

By H. E. TYSON,
M.A. (Cantab), M.I.Min.E.

Presidential address to the National Association of Colliery Managers, given at the annual meeting at Southport (Lancs) on Wednesday.

THERE is special aptness in the holding of the annual conference of the NACM in Lancashire because it was in Lancashire that the association was born, and it is especially interesting that the first secretary of the association, Mr. James Newton, came from St. Helens. He would, I think, be proud of the association as it is today, numbering nearly 3,000 members, all of whom are the holders of first-class certificates of competency, all of whom and only whom are legally qualified to be managers of mines.

In 1886, the Wigan Colliery Managers' Association held its meetings at the Victoria Hotel, Wigan. In May, 1887, a Bill was presented to the House of Commons by the Home Secretary, proposing to create second-class certificates for colliery managers. Both the owners and the miners had expressed their opinions to the Home Office, but the colliery managers had had no voice in the matter. A deputation to protest against the lowering of the standards for colliery managers sought an interview with the Home Secretary, but the difficulty was to satisfy him that the members of the deputation represented the views of colliery managers throughout the United Kingdom.

National Organization Formed

On June 4, a meeting was held in Wigan at which it was resolved that the meeting constitute itself the National Association of Colliery Managers, as a nucleus to be augmented by branches to be formed in various mining centres of the United Kingdom. Mr. Mehers, of Wigan, was appointed president, and Mr. James Newton, of St. Helens, was appointed secretary.

A meeting was called by advertising in newspapers in nearly all the mining districts in the United Kingdom. This meeting was held in the YMCA Hall, Peter Street, Manchester, on Saturday, August 6, 1887, and representatives from Lancashire, Cumberland, Staffordshire, Yorkshire, Derbyshire, and North Wales were present. The association was thus duly formed and the following resolutions were passed:—

(1) "That we, the certified colliery managers here present, do hereby unite ourselves under the title of the National Association of Colliery Managers, in order that the rights and interests of colliery managers may be protected and maintained and the position of the profession advanced in all worthy directions.

(2) "That the primary objects of the association be '(*a*) The protection of the interests and the social, scientific, and intellectual position of the members of the association, and '(*b*) To watch all legislative and legal matters affecting the interests of members'."

Mr. S. Alsop presided at a meeting in Manchester on November 5, 1887, and at the council meeting at Manchester on December 17, 1887. It was at this latter meeting that the rule restricting membership to holders of first-class certificates only was adopted.

It was also proposed that, owing to the lack of uniformity in various districts of boards of examination, some being difficult to satisfy and others not so difficult, to petition the Home Secretary to set up a Central Board of Examiners, under the control of the Home Office, to issue and examine all examination papers, only the

viva voce part of the examination being conducted by local district boards.

From this brief history of the beginning of the association the ideas and the ideals of those managers who founded it can be seen, and it will be agreed, I think, that although the coal-mining industry and its organization have changed so much, we have faithfully maintained those high ideals laid down for us for the protection and advancement of the profession of colliery manager.

Boom and Slump

The industry in which we are employed has indeed changed over the last 70 years, and I think it is true to say that never has the position of the colliery manager been an easy one. Apart from natural conditions which have challenged his skill, his leadership, his patience, and indeed his physical strength as well, the industry seems always to have been alternating between booms and slumps, and still is, in spite of the assured future which nationalization was expected by the miners to bring.

During the booms the colliery manager has been pressed for greater and ever greater production; during the slumps he has been urged for ever greater reductions in costs. Neither of these conditions has helped him to concentrate on preserving an even balance of gradual and evolutionary improvements in mining practices and a stabilizing of the industry generally.

Those who were in mining 30 years ago well remember the heart-breaking lengths to which we were forced to go to keep the industry alive at all. During the years from 1940 up to 1957, again the managers, and the miners, too, worked night and day and weekends in an endeavour to supply the nation with the coal which it demanded. During the last two years, again we have been urged to get costs down and productivity up rather than increase production.

The manager always gets the hard work whether times be good or bad. He is told that what he produces is too small in quantity, or too small in size, and always it is too expensive, although since 1947 the industry has subsidized every other industry in the country, and especially the highly favoured steel industry, by providing coal at much less than what it would fetch in an open market. He has not yet been told it is the wrong colour, but perhaps this has yet to come. History is repeating itself, but I venture to believe that this time there will be nothing so catastrophic in the change-over from production to productivity, thanks to the policy of the National Coal Board and especially to the courage of its chairman over the last two years.

Planning for the Future

At this conference you are to have expounded to you by the members of the National Coal Board what the future is expected to hold for the coal mining industry, how the plans for reconstruction, technical progress, finance, industrial relations, and marketing were made, and how they are expected to be carried out. You will not be left guessing and wondering. All the speakers have agreed to enter into discussions on their papers and to answer any questions which you may care to put to them, and I hope you will take the opportunity of airing your views and expressing your opinions and making what may well be vital constructive suggestions or contributions to the proposals of the board. From no other organization can the members of the board receive such frank and, what is more important, knowledgeable appraisals of their plans, and from no other organization will they receive such loyal help and support in trying to make them work. It is a sign of the great trust that the members of the National Coal Board place in the association that they were all willing to come and talk to us during these three days about their plans, and it is encouraging also to know that they have every confidence that these plans are sound and realistic, and that they have no hesitation in making them public.

During the years since 1947 it is to the eternal credit of the National Coal Board that reconstruction and forward planning were not sacrificed to the immediate demands for greater output. Instead, a plan for the future was evolved and was implemented as far as was possible. It is true that the plan has had to be revised once or twice, but that was inevitable as time went on, and the improvement in productivity and lower costs achieved last year, largely as a direct result of adherence to the plans of reconstruction, will enable the industry to face what is a difficult future with confidence.

Better Publicity Needed

It cannot be denied that the general public, and its mouthpiece and source of information, the Press, have rarely befriended the coal-mining industry. Perhaps this is due to the nature of our calling. The very thought of spending the hours of daylight underground in a tussle with Nature is somewhat frightening to the man in the street, and has tended to set the miner apart as a peculiar sort of being with ideas, ideals, and ambitions not quite in keeping with those of ordinary men.

The public and the Press have always regarded the mining of coal as an extremely dangerous occupation, and yet have always been reluctant to pay an economic price for the product we provide. This, in my opinion, has been due to bad publicity, and nothing else. It cannot ever be easy to attract recruits to the industry. It is noteworthy that even during the war it was easier to get people into munition factories, even those handling explosives, than it was to get people into the mines, and in the end mining had to be made an alternative to joining the armed forces. We who are engaged in it know that there are many worse jobs: the life of the deep-sea fisherman, the merchant seaman, or a shipyard worker exposed to the full rigour of winter's wind and ice and snow must be much less attractive than that of the average miner, whose working place is air-conditioned and much the same throughout the year.

We must let the public know what has been done to make our mines better and safer than they have ever been and must let them see that no effort is being spared to make them better and safer still. I am certain that most of our collieries are more efficient than many factories and works which are able to make large profits. Some of the advancements made in the field of greater efficiency and greater safety are almost revolutionary in their conception. Let me review a few of the things which have been done.

Achievements in Safety

The technique of methane drainage is one of the outstanding accomplishments of the mining industry today. Millions of cubic feet of methane are daily being drawn safely from working places, reducing to an immeasurable degree the hazards inherent in gas emission on faces and accumulations on roadways. Note well that the practice is paying dividends in hard cash. The utilization of methane drawn from underground is saving money and coal in ever increasing amounts.

The introduction of fireproof conveyor belting, now nearly 100 per cent., insisted on by the National Coal Board, has nearly removed the hazard of fire from the belt conveyor altogether.

Water infusion and other dust suppression measures will eventually remove the risk of pneumoconiosis and of silicosis just as surely as improved lighting standards have conquered the once prevalent and greatly dreaded nystagmus.

"Safe," "equally safe," and "ultra-safe" explosives are now in exclusive use, and the introduction and extension of multi-shot and delay-action firing have greatly reduced the possibilities of explosions and accidents from shotfiring. The latest technique of pulsed infusion firing under water is a further development showing great promise. This technique, when carried out in solid coal, removes machines from stables and headings and is bound to lead to a reduction in accidents at roadheads from falls of ground.

The widespread use of hydraulic supports, both props and chocks, which can be set to give an even resistance to roof and floor, makes the control of strata movement so much more positive and scientific, and is reducing the incidence of falls of roof, which are fraught with so much danger, as well as being expensive interferences with production.

The extension of the old technique of total caving of the wastes, now made possible to a much greater extent because of hydraulic supports which give a consistently resistant breaking off line, is reducing the hazards of strip pack building, a process which led to many accidents and is expensive in manpower.

Revolutionary is the introduction of self-advancing supports—a development of the hydraulic support—whereby a man can get his supports under newly exposed ground from a position of absolute safety. The number of these installations is rapidly increasing and they are not only increasing the safety of all who work on the face, but are saving labour and money as well.

There are some 80 installations of power stowing making for better roof control and reduced subsidence.

Improvements in the design and manufacture of everything concerned with the use of electricity in mines have perhaps not been so spectacular, but it can be said that many pieces of apparatus which were regarded as safe only 10 years ago would not be so regarded today.

Good mine lighting is perhaps one of the greatest aids to safety and efficiency that exist, and the general introduction of large fluorescent lights has made working places more pleasant and safer all round.

The improvement in gas detectors and the research being now conducted into automatic gas alarms show great promise for the immediate future.

Improvements in the techniques and machinery used in fast tunnelling and especially in the sinking of shafts have added immeasurably to the safety of what were once notoriously dangerous operations.

Still More Needed

I make this catalogue, not to inform you, since many of you have been actively associated with the introduction and development of these improvements, but to place them on record, that the public may learn that in spite of all our day-to-day difficulties progress and research have never stopped.

It would seem, however, that all this is not enough. Look at the record of accidents in coal mines as published by HM Chief Inspector of Mines in his annual report, which gives figures of fatal, reportable, and serious accidents, and "over three day absence" accidents since 1913 (Table 1).

TABLE 1.—*Accidents in Coal Mines.*

Year.	Fatal.	Serious or reportable.	Over three days' absence.
1913–22 (average)	1,298	4,692	151,254
1923–32 (average)	1,064	4,197	170,056
1933–42 (average) ..	877	3,123	140,297
1943–52 (average)	538	2,293	198,381
1953	392	1,586	233,954
1954	371	1,520	222,932
1955	425	1,538	217,305
1956	330	1,472	220,692
1957	396	1,604	198,129
1958	327	1,752	206,855
1959	348	1,676	209,168

NOTES:—Output 1913–1922 (average), 260,700,000 tons; 1959, 195,300,000 tons.
Persons employed, 1913–1922 (average), 1,085,500; 1959, 688,000.
Manshifts worked, 1913–1922 (average), 2,798 hundred thousands; 1959, 1,522 hundred thousands.

After making allowances for reduced output, the smaller number of men employed, and reduced manshifts worked, I think you must agree that the last two or three years have been most disappointing—and this, after a new Mines and Quarries Act.

Must we then have more legislation? It is probably true to say that no other industry is so

beset (and I use the word "beset" advisedly) with legislation for safety, so inspected and examined, and so tied in getting permission from a civil servant before doing this or doing that. In no other industry must the managers be so highly qualified in the legalities of their profession, leaving no doubt that they will be held responsible for the safety and health of all those in their employ. In no other industry are managers and officials brought so severely to account for their own failings or the failings of others. Indeed, it was said many years ago by a man more eminent than I, that he wondered whether the burden of legislation was too great for one man to bear, and there has been a lot more of it since he said that.

As I am convinced that the heavy toll of accidents on the roads will be better reduced by the work of traffic engineers and road safety officers in improving the roads and educating the public rather than by the activities of the police and courts of law, so I am sure that greater safety in mines will be better achieved by the raising of professional standards of work and workmanship and by the education and training of workmen and officials assisted by an internal organization of specialists in safety engineering, rather than by adding rules and regulations or by increasing prosecutions and penalties. The Prime Minister himself, when introducing the new Road Traffic Bill, admitted that legislation of itself can achieve nothing.

Do not think I have any quarrel with HM Inspectors of Mines. They are all qualified and experienced men like ourselves, men of our own profession, and most of them are members of our association. It is a pity that they were not absorbed into the National Coal Board organization in 1947, when they would have formed the experienced nucleus of an internal safety and inspection department second to none.

Everybody's Business

Safety, you will say, is everybody's business, especially that of the qualified colliery manager, the qualified undermanager, the qualified overman, and the qualified deputy, but it often happens that everybody's business becomes nobody's business, and the need for properly qualified specialists in legislation and safety to advise and assist the manager is perhaps greater today than ever, when a manager has to be more of a true "manager" and cannot hope to attend to all the details of the working of his colliery in person.

While capital reconstruction can reduce the number of men we require, while method study and mechanization can reduce the number of men we require, while good relations and rates of wages can reduce the number of men we require, when the numbers are down to the absolute minimum accidents reduce the number of men we must have, and the whole of this structure of planning, reorganization, and expenditure of money and thought will come tumbling down.

It is very easy to regard safety in the same way as we regard charity and good works. Human loss and suffering is so much a feature of accidents that there is a very real danger of the feeling creeping in that when we do something for the sake of safety we are doing something specially virtuous, something in fact outside the ordinary rough and tumble of everyday work and everyday life; something indeed about which we have a choice, which will not unduly affect our business and its success or otherwise; something which we do when we have time to spare from other seemingly more important things; something more suited to leisure hours and Sundays than to weekdays. In the same way there is a tendency to regard the man who specializes in safety as a man with altruistic motives, with ideas of impossible perfections, a "do-gooder" who would rather make excuses for the victims than face the true facts, a man who spends our money, his time and ours if we let him, in helping to improve the lot of his fellow men, a man whose work is really something akin to a hobby, a man in other words who plays no part in the hard-headed business of costs and profits, a man of whom we can take notice or not, a man we could easily do without, a man we could easily replace.

Part of the Production Team

Those who are older and wiser know that safety is not welfare, that the safety specialists are not welfare officers, that safety is not a part of the welfare state, but is a very important part of production, productivity, and costs, and that safety officers must be regarded as important members of the production team, as was recognized by the first National Coal Board when in the beginning it placed its safety organization in the care of the production department.

That this business of safety is compatible with, and indeed a vital part of productivity, is, I think, borne out by the figures in Table 2, which indicate

TABLE 2.—*Fatal and Non-fatal Accidents*, 1938–1946.

Year.	Fatal.	Non-fatal reportable.
1938	858	3,157
1939	783	3,155
1940	923	3,237
1941	925	2,990
1942	877	2,809
1943	713	2,596
1944	623	2,553
1945	550	2,353
1946	543	2,335

how greatly the number of fatal and serious accidents in mines dropped at a period during and immediately after the war, when production for survival was paramount, when there was no new legislation, when people must have been adversely affected by the strain of wartime conditions, when materials were in short supply, when much of the labour was new and "green," and it would seem that conditions were just right for a big increase in serious accidents. Yet the very opposite occurred.

Safety officials must be as hard-headed and businesslike about safety matters and accidents as any other members of the production department

and money spent by the safety department must be made to show a profit. I believe this is the only sensible way to set about this business of accident reduction. Profit and loss accounts can usually be taken as pointers to efficiency. Let us then assess the cost of accidents and see how it affects our balance-sheet.

In my New Year message to you I said that accidents were expensive things, but I wonder if you realise how expensive they really are. Examine the facts and try to cut out the guesswork.

The most obvious hard-cash cost of accidents is in the payments of damages arising out of claims made under Common Law by workmen who sustain injuries and consequent financial loss caused by the negligence of " the board, their servants, or agents." At present the cost of these is borne generally, but it is a sobering thought that they should be charged to the pit from which they arise. This will hardly be a fair method of charging, but it could easily be done as an insurance charge, as is done now for many private firms, on the basis of the accident record.

Some Calculations

I do not know the actual amount paid out by the board during 1959, but I think a conservative estimate would bring it to something like £5,000,000, an average of about £1,000 per claim and £25 per " over three day " accident. From this charge alone you can reckon every " over three day " accident at your pit is worth £25 on the debit side of the balance-sheet, if placed on an insurance footing.

And remember that these claims can only succeed if there has been some negligence on the part of the " board, their servants, or agents." Some of us feel a little resentful about these claims, holding that it is hardly fair that we should be responsible for the failings of others, but the law is quite clear on this point. Apart from liability for a breach of statutory duty which is laid upon us by the Mines and Quarries Act of 1954, there is a liability under the Common Law of the land, which says that anyone causing another person financial loss or damage can be sued to make it good.

There is nothing new about Common Law liability and there are records of claims going back to the early years of the last century, although it was generally held then that an employer was not liable for negligence of a fellow workman—the plea of " common employment " which held good until the Law Reform (Personal Injuries) Acts of 1948. The Workmen's Compensation Act of 1925 enabled the workman to obtain compensation for an injury from his employer, but laid down that he could not claim damages under Common Law as well as receive compensation, and he had to choose between accepting compensation and making a claim for damages at Common Law, in which, of course, he might fail.

The National Insurance Acts of 1948 did away with this choice, and it is because of these two acts that Common Law claims have multiplied since 1948. The employer's duty was clearly laid down in 1938—he must, where there is a risk, employ skilled craftsmen, he must provide suitable plant and equipment, he must lay down a safe method of work, and he must exercize such supervision as is necessary to ensure that the work is done safely and properly, and there is no escape from this liability.

The cost of weekly national insurance payments by both employer and by workmen is the same, whether a man works one day in a week or five, and if a man loses part of the week through accident we are paying relatively more for national insurance than we should. The excess is easily reckoned and can be charged directly to the cost of accidents.

The board pays annually some £3,500,000 as a contribution to the Fatal Accidents and Mineworkers' Supplementary Injuries Scheme, and this is in direct proportion to the number of accidents of all kinds.

Incidental Losses

So much for hard-cash costs of accidents. In addition, consider the incidental losses caused by a man's absence from work. Here I must admit that we enter the field of speculation as to amount, but the losses are nonetheless real. The average length of absence from work caused by an accident is about 20 working days, and we are losing some 5,000,000 tons of coal a year through this lost time caused by accidents. In terms of money, after deducting the man's wages, which, of course, are not paid to him, this represents a loss of about £10,000,000 a year revenue to the board.

We do not often see on reports of losses how much coal is lost by absenteeism of this nature, because it is usually so spread that the face gets filled off in any case, but clearly the effect is there somewhere and the evidence arises when we see the great surge of output during " bull " weeks.

Money spent on training (and it is considerable) is money wasted every day that the trained man is not available for work.

Accidents mean, in fact, that somehow, somewhere, there must be more men on the books than are actually needed, and this number will tend to diminish as productivity increases, so that the effects of accidents on production and costs will increase rather than the reverse.

Five hundred firms in private industry have their own fire brigades and save money on their fire insurance by having them. Can collieries not be assessed for fire insurance and be allowed rebates because of an efficient fire organization? The manager of a colliery who today is conscientious about fire precautions is penalized by the money he spends instead of showing a saving on his insurance costs.

Facing Facts

I admit that we cannot make roads like city pavements nor coal faces like factory benches. I agree that the miner must be wholly fit when he comes to work and consequently he is more

liable to have to stay off with an injury that a factory or office worker might carry, and I submit that it will never be possible to get our accident rate and count of shifts lost through accidents down to those of factory workers in more favourable surroundings. But the facts must be admitted and the effort must be made.

Much can be done by an improved safe environment, improved plant and materials, improved methods of work, improved standards of supervision, improved and more practical education and training, by better "housekeeping," and finally, and by no means least, by the setting of an uncompromising example by all those placed in positions of responsibility and authority.

Let us then have a revised plan for safety in our collieries and a true assessment of its value made. For in this direction of greater safety lies one of the best guarantees that we shall get and keep an adequate number of skilled workmen, that we shall maintain a higher morale, that we shall obtain better working conditions, and shall earn more of the substantial financial rewards which this industry can provide if we but give it the chance.

QUICK RELEASE CONNECTIONS FOR PIT ARCHES

DEVICE for connecting pit arches which provides the facilities for either slow closure or controlled release has been invented by Mr. G. G. Heathcote and Mr. J. R. Ashley, of the East Midlands Division of the National Coal Board.

It is designed for use behind rapidly advancing mechanized faces, where the initial roof weight is taken on arched supports some 70 to 150 yd. behind the coal face.

FIG. 1.—ARCH CONNECTIONS SHOWN IN POSITION.

The connection, shown in position in Fig. 1, consists of a box form made up from mild-steel plate some 30 in. in length and curved to suit the arch diameter. The upper section is pressed out to receive the bottom carrying channel, which is held in position by extensions from the upper section, bent to form two square carrying brackets. Between the bottom of these brackets and the lower channel, two slotted wedges are inserted, which locate on stops welded in the base. These wedges when driven outwards, lift up the channel and secure firmly the two ends of the arches. On the inside of this lower channel welded strips, or ridges punched in the channel, form stops, 6 in. each side of the centre, holding the arch ends some 12 in. apart.

When arches are set at the ripping lip the connection is pushed on to the end of one arch section and secured temporarily by the wedge. The halves are lifted together and the box slid across on to the second half. The arch sections are now pushed out and secured in the correct position by tightening the wedges.

Arch Protection

The device may be set to allow complete slow closure of the arch sections through the box, or may allow limited closure with final holding of the arch sections 12 in. apart. The latter method gives arch protection, and also makes possible the speedier release of the arch by the back rippers, at the resetting point behind the face. When released, the box form of this arch connection prevents twisting of the sections and continues to hold the arch securely until ready for dismantling, and subsequent resetting of the arch. After release the arch connections are sent back to the forward ripping for re-use.

The device has also been built in the form of a retracting wedge box stilt. When used in this form greater retraction is possible where closure is heavy.

The stilt box can also be set in position under the lip before firing This makes it possible, after removing the temporary covers, to set the arch sections and secure the roof permanently before the ripping debris is moved.

BISRA Steelmaking Conference

ALL-BASIC OPEN-HEARTH FURNACES

Details of the recent 54th Steelmaking Conference of the British Iron and Steel Research Association, held at Harrogate, appeared in our last issue (p. 1199). Below we give an exclusive abridged report of the opening papers presented at the conference. These papers were on the subject of "Roof Construction."

DESIGN OF BASIC ROOFS FOR OPEN-HEARTH FURNACES

By Dr. W. A. Archibald (BISRA)

OPENING his address, Dr. Archibald said that, although the main justification for the use of basic roofs on open-hearth furnaces was the faster rates of production that they permitted, there was a considerable potential advantage to be gained by

Fig. 1.—Cracked Basic Bricks.

securing longer life. It had frequently been observed that, under most conditions of application of basic refractories to roofs, the bottom portions of the bricks were prone to crack and drop off (Fig. 1). Accordingly, accepting this refractory defect, attempts had long been made to improve the life of basic roofs by means of special designs, intended to diminish the loss of brick ends.

He considered the theory of sprung voussoir (*i.e.*, tapered brick) arches, and indicated that the mechanical inverse of a perfectly held arch was a uniform chain hung between two points, since it could not support bending moments. The curve assumed was called a catenary, which was thus also the shape of an ideal arch. However, although a steep catenary was very different from a circular arc, it could be considered to be practically an arc at the relatively low arch rises used in most furnace roofs. Since, unlike a chain, a thick arch could support bending moments, it could depart from ideal holding conditions, if not held by skewbacks or pivots placed perfectly correctly, in eight salient directions (Fig. 2). The author showed how the brick joints must open when the line of pressure fell outside the centre third of the load-bearing thickness of the bricks.

Progressive Reduction in Taper

Considering the heating-up of a given arch from below, he called attention to the progressive reduction in taper caused by differential thermal expansion. Dr. Archibald then showed a ciné film in which a mechanically operated model was used to simulate the effects of heating and cooling on the behaviour of expansile arches supported by the various conventional fixed skewback designs, as well as by a BISRA flexible system. It could be seen that fixed, or vertically fixed, skewbacks resulted either in the pressures rising and falling or in joints opening at the hot face, according to whether the arch was built to fit at the cold or the hot contour. Neither of these disturbances at the

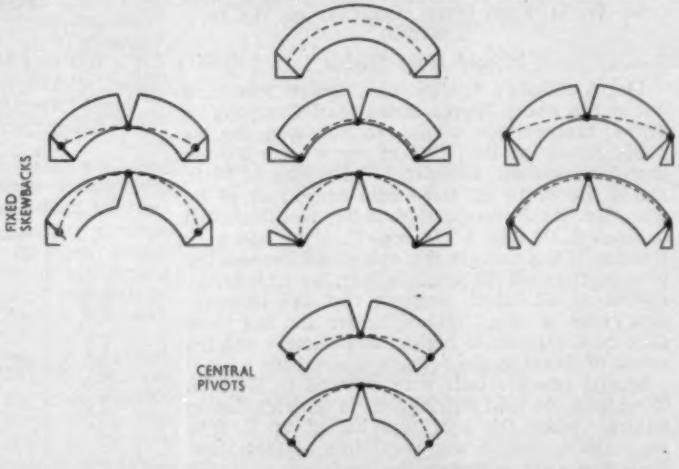


Fig. 2.—Salient Directions in which the Support of an Arch can Depart from Ideality.

hot face was conducive to preventing the loss of cracked brick ends. This behaviour occurred whether or not there was any overhead restraining gear.

The special provision of holding down and suspension gear in conventional basic roof designs separately or together was therefore mainly of value in preventing severe distortion of the arch, particularly when it became badly worn. He suggested that, theoretically, the best way of using these conventional designs was to arrange for the bricks to *fit* at the *hot* contour of the arch to which the contour of the overhead gear should also be fitted.

The last demonstration on the film showed the behaviour of an arch held between pivots centrally placed at the ends, one of which was supported by suitably flexible springs. It was considered from theory that this would preserve a constant "grasping" pressure on the bricks and so tend to retain brick ends.

Dr. Archibald then showed how the required load/displacement characteristic could be obtained by calculation and described how such a flexible design was studied, along with various other designs, on a heated laboratory model using perspex bricks fitted with hot and cold face load meters. The results were as expected from arch theory; for example, during heating and cooling, the hot and cold face loads on the crown bricks diverged widely in arches held between fixed skewbacks, whereas those in a flexibly held pivoted arch remained equal (Figs. 3 and 4). The flexible arch curvature flattened on heating and increased on cooling and this confirmation on the model led to the full-scale trials of the BISRA flexible design on open-hearth furnaces of the Steel Company of Wales, Limited, which were to be described by Mr. W. M. Fern.

PRODUCTION FURNACE ROOF TRIALS

By W. M. Fern (Steel Company of Wales, Limited)

Pivoted Roof Design

Dr. Archibald's flexible roof design was tried out at the Abbey Works of the Steel Company of Wales, Limited, by building an 8-ft. wide flexible panel across the Port End of one of the 200-ton capacity furnaces. This panel had a span of 18 ft. and a rise of 18 in. when cold and 12 to 14 in. when hot. As the temperature in this area fluctuated between 1,200 and 1,500 deg. C. about every 20 minutes, it was thought that this would increase the tendency to spall the arch. In fact, the arch hardly spalled at all, which suggests that this temperature range is only "critical" after the hot faces have been exposed to higher temperatures and the action of fluxes in the furnace atmosphere.

Special pressure cells were installed in the arch to measure the load distributions in the arch during service. When the roof was heated up it sank about 3¼ in., which was very close to theoretical prediction, and although the loads were of the correct order, they were high on the hot faces and low on the cold, *i.e.*, the arch tended to "hog."

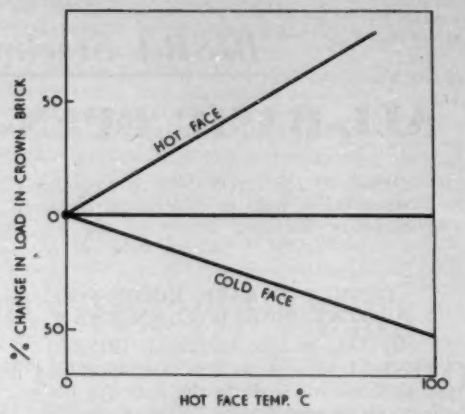


Fig. 3.—Fixed Skewback Model Arch.

On cooling, the reverse situation occurred. This indicated that the spring or pivoting system was not working properly and a definite confirmation of this was that the roof sank instead of rising when it cooled down. The main cause of the trouble appeared to be a high hysteresis loss on the springs and the possibility of using helical or "liquid" springs was now being investigated. The panel lasted over 600 casts; a large area of it was still 11 in. thick at the end of the campaign.

A second panel with slightly modified springs and no steel fusion plates in the brick joints was installed as it was thought that the oxidation of the plates was an undesirable variable. This, however, spalled early in its campaign and only lasted 292 casts and this was interpreted as indicating the necessity of using steel fusion plates to make the hot faces monolithic.

To sum up, although these test panels had not behaved exactly as intended, their performance was sufficiently encouraging to start planning for a trial of a full roof of this pivoted design. BISRA was now working on a design using water-cooled "liquid" springs, but there were still several practical design problems to be surmounted.

Hot Curvature Construction

Another means of achieving conditions rather similar to the flexible roof was to use hot face ex-

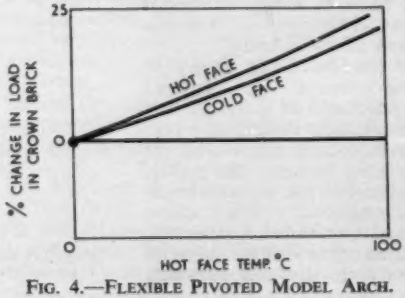


Fig. 4.—Flexible Pivoted Model Arch.

pansion to build a roof to its hot contour and then mechanically restrain it and endeavour to keep the temperature reasonably constant. Two test panels, built with and without this expansion, showed striking differences on heating up without restraining battens, the tight or expansion-free panel "hogging" so badly it almost broke its back. Despite this, there was little difference on the final roof thicknesses of the panels when the tests ended.

This technique of hot curvature building is now standard at Margam and Port Talbot steelworks, which have six and five all-basic furnaces, respectively. The first few roofs to complete their campaigns have had lives of the order of 250 casts, but these should improve with experience of the new practice.

SHEFFIELD REFRACTORIES FOR DURGAPUR

BUILDING of the Durgapur integrated iron and steel plant by a British consortium involved the supply of many thousands of tons of refractories which could not be obtained in India. For the linings of the three modern blast furnaces designed and constructed by Head Wrightson & Company, Limited, it was decided to adopt conventional lining material, and General Refractories, Limited, Sheffield, was able to meet the demand for the huge qualities of high-grade refractories required. Foster carbon bricks were supplied for the hearth ring walls and wells, Foster Crown quality for the hearth centres, boshes, and stack inwalls, with Foster high grade for the remainder of the stacks. For the lower part of each furnace, Durax No. 3 air-setting was used as bonding material and Foster high-grade chamotte for the stack jointing. The tap-hole blocks were made of GR Sillmax material.

In addition, for the No. 1 blast furnace General Refractories supplied Foster Crown and Foster high-grade quality both for the stove lining and the McKee-type checkers. The necessary insulating materials for these stoves were supplied in GR Amberlite 43 and 87 grades. The primary and secondary dust catchers were lined with Foster high grade and Amberlite 87 insulating bricks. The bustle mains, stove stack linings, and waste-gas flue linings, the blast-furnace offtakes and uptakes, hot-blast valves, and connections were also lined with Foster high-grade quality firebricks. Amberlite 43 and 87 grade insulation bricks were used to insulate the hot-blast mains.

The two 800-ton capacity inactive hot-metal mixers were lined with GR Supermag magnesite blocks for the working and backing linings, Glenboig A.1 quality bricks for the backing courses, and GR insulating material for the shell insulation. The roofs were built of Glenboig ML quality firebricks and the observation ports and burner blocks were constructed of GR Sillmax 54 blocks. For the open-hearth furnace plant, General Refractories supplied refractories of several qualities. This supply included Densyl super-duty silica and Lowood standard silica bricks for the roofs, together with large tonnages of Spinella chrome-magnesite for walls and Supermag magnesite bricks for sub-hearth and tapping hole. Magnesite-chrome bricks were supplied for the port and uptakes.

Construction of the bottom-fired soaking pits involved the supply of refractory recuperator tubes of a specialized design, made from Scottish fireclay at the Glenboig works of the group. The same works also supplied large quantities of firebricks in various qualities for other sections of the soaking pit construction. The mill bloom reheating furnaces required the supply of specialized sillimanite refractories for the walls, skids, and burner block assembly. These needs were met from the Sillmax range.

GR Adamantine and Alumantine bricks were specified for the kiln linings, where resistance to abrasion and high temperatures was of paramount importance. Similarly, for the dolomite calcining kiln, GR Alumantine bricks were specified.

Forthcoming Events

JUNE 9

North of England Institute of Mining and Mechanical Engineers: Meeting in the lecture theatre of the institute, Neville Hall, Newcastle-upon-Tyne 1, at 2.30 p.m. "The Influence of Percussive Action on the Ploughability of Coal Seams," by Prof. E. L. J. Potts and F. F. Roxborough.

JUNE 15

Midland Counties Institution of Engineers:—Visit to the works of the Parsons Chain Company, Limited, Stourport-on-Severn (Worcs).

JUNE 29—JULY 1

Institution of Mining Engineers: Summer meeting in Cardiff. "The Degradation of Coal in Power Loading," by G. V. Standerline and Dr. S. Islwyn Evans, and "Pulmonary Disability Among Coal Miners, with Special Reference to the Pneumoconiosis Field Research," by John M. Rogan.

JULY 25

Institute of Metals: Meeting at the Royal Institution, Albemarle Street, London, W.1, at 6.30 p.m. "The Structure of Metals and Intermetallic Compounds," by Prof. Linus Pauling, of the California Institute of Technology.

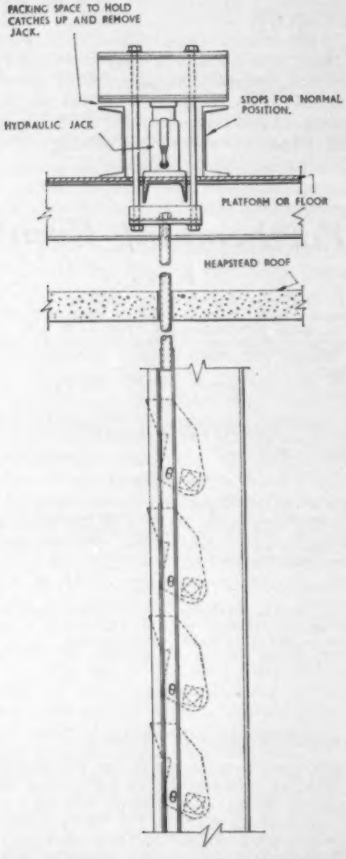
International Institute of Welding

The 1960 annual assembly of the International Institute of Welding is being held in Liège from June 12 to 18. Meetings of all commissions will take place and a series of evening lectures by international experts has been arranged on the welding of thick material. One of these lectures is to be given by Dr. H. Harris, of the UK.

Testing Device for Bennett Catch Gear

METHOD of carrying out periodic tests of Bennett catch gear, which eliminates the levers and linkages normally used for this purpose, has been devised by Mr. A. J. Williams, chief engineer in the No. 3 Area of the East Midlands Division of the National Coal Board.

Both the manufacturers and the engineers in the No. 3 Area felt that some form of torsion mounting should be used for Bennett catches to give a "kick" return on the catch. The purpose of this is to eliminate the sticking of catches due to seizing, and also their slow operation due to their inertia, but testing of catches with the new mountings became difficult because of the considerable force needed to lift them against the torsion arrangements. This difficulty has been overcome by Mr. Williams' arrangement, as illustrated in the accompanying drawing.


PACKING SPACE TO HOLD CATCHES UP AND REMOVE JACK.
HYDRAULIC JACK
STOPS FOR NORMAL POSITION.
PLATFORM OR FLOOR
HEAPSTEAD ROOF

CATCHES SHOWN IN THE "RAISED" POSITION.

The essential feature of the device is the modification of the top end of the testing linkage to accommodate a hydraulic jack. This jack is used for test purposes only and is removed immediately afterwards. The drawing shows the catches in the "raised" position: they are connected through the linkage, which joins all the catches together in one vertical row. When the catches are lowered the top end of the linkage rests on packs in such a position as to allow free and adequate movement of the catches in the event of a cage overwind.

For purposes of testing, the jack is placed in position and the catches are raised hydraulically. A pressure gauge attached to the jack enables readings to be taken of the force required to lift and lower the catches; the readings then enable comparisons to be made of the condition of the catches at each test period. These comparisons will indicate any deterioration in the torsion bushings, and any seizing of the catches, bushes, or other equipment in the system.

In the event of an overwind, or for any other purpose, the catches can be held indefinitely in the "raised" position by placing packing wedges between the crosshead and stops.

REMOVING OIL FROM EFFLUENTS

METHOD for reducing the oil content of emulsified waste liquids to trace amounts, of the order of 1 to 5 mg. per litre, has been developed by the British Coke Research Association. The method uses cheap, readily available materials such as fine coal or coke, which do not require specialized treatment or preparation.

Wastes containing between 20 and 2,000 mg. of oil per litre are treated in what is basically a two-stage process. The first stage is particularly effective with wastes containing more than 200 mg. of oil per litre and where oil is floating on the surface, while the second stage is especially applicable where the initial oil content is 100 mg. per litre or less, such emulsions having been found to be the more difficult to treat. In this context, oil refers to non-volatile matter extractable by light petroleum.

This method of oil removal will be of particular value to the coking industry and may well have useful applications in other industries with similar problems of oily effluents. It should be emphasized that any method of treatment, however good in itself, must be considered and possibly modified in relation to local conditions which may complicate what superficially appears to be a straightforward solution to the problem.

Two Centuries of Service

Bicentenary of the foundation of Lloyd's Register of Shipping is being celebrated this year. The society's annual report for 1959, issued recently, records the completion of two centuries of service to shipping and gives a wealth of information relating to world shipping activities of the past year. Of particular interest is an article on "Shipbuilding at the Crossroads," while many of our readers will find the extensive section on engineering of value. The report is issued from 71, Fenchurch Street, London, E.C.3.

Engineering Aspects of a
MODERN OPEN-HEARTH STEEL PLANT

PRINCIPAL FEATURES OF RAVENSCRAIG

The engineering aspects of the open-hearth steel plant at the Ravenscraig Works of Colvilles, Limited, form the subject of a paper presented by J. A. Kilby and J. C. Gordon to the West of Scotland Iron and Steel Institute. It is the most recent steelmaking unit of its type installed in Europe and, in view of the rapid developments in pneumatic processes and of the fact that this may well be one of the last large-scale open-hearth plants to be built, more detailed treatment of its main features than has hitherto appeared seems desirable for future reference. An abridged version of the paper is appended.

STEELMAKING in the west of Scotland has traditionally been by the cold metal process and, prior to the construction of the Ravenscraig Works, only one integrated plant was in operation in this area. The site occupied by the Ravenscraig Works is located to the north-east of the Dalzell and Lanarkshire works. It is roughly triangular in shape, being bordered on the south by the two existing works, which have access to the main Glasgow-London railway line, on the east by the Wishaw deviation line, which is carried on an embankment about 25 to 30 ft. high for practically the whole length of the site, and on the west by a main highway. The site is divided from east to west by the South Calder Water, which forms a valley about 80 ft. below the general ground level.

The layout of the Ravenscraig Works on completion of the first stage of development is shown in Fig. 1. It comprises one blast furnace with 25-ft. 9-in. dia. hearth, one battery of 70 coke ovens with by-product plant, and an open-hearth plant which has two 800-ton inactive mixers and three 250-ton fixed furnaces. Both the iron and steel making plants were laid down so as to be capable of expansion to approximately three times their initial capacity.

Providing for Future Changes

The requirement of the steel plant was to produce 400,000 tons of ingots per annum for the manufacture of heavy plates, a large proportion being of special qualities used in the production of pressure vessels and similar equipment, and forging blooms. In order to meet the plate rolling programme, ingots of inverted and ordinary types from 6 to 40 tons weight had to be provided for and, in addition, some regard had to be paid to possible future changes in the pattern of demand which might arise from the installation of finishing mills on the Ravenscraig site. The overall layout of the melting shop is shown in plan (Fig. 2), and in cross-sectional elevation (Fig. 3).

In contrast to most modern plants the Ravenscraig Works has been arranged on three levels. The ore, coal, and limestone reception sidings adjacent to the Wishaw deviation line are at an elevation of 330 ft. O.D., the blast-furnace and coke-oven plants at an elevation of 300 ft. O.D., and the melting shop casting bay at an elevation of 280 ft. O.D. The hot metal is delivered from the blast-furnace plant over a level rail track on to the melting-shop stage, which is at an elevation of 300 ft. O.D., this constituting a fundamental difference from other similar works, where the hot metal is delivered to the shop at ground level. This choice of levels allied with other conditions of site, permitted the location of the melting shop materials holding sidings also at stage level and avoided the necessity of providing the long ramps which are normally required in more conventional layouts. The melting shop has a perimeter road with connections into all buildings, including the valve pit, and with direct access on to the furnace stage.

Raw Materials Supply

Hot Metal.—Hot metal is delivered in 75-ton capacity Kling type ladles over a completely independent rail track from the blast-furnace plant to the south end of the furnace bay, these ladles being propelled by a twin diesel-electric locomotive of two 165-h.p. units to the 800-ton inactive mixers. Hot metal is drawn, as required, over the pouring spout into a 75-ton capacity transfer ladle mounted on a weighing machine during filling. As the mixers are located in an extension of the furnace bay with common crane gantry it is possible, in view of the relatively small number of furnace units so far installed, to transfer the filled hot-metal ladles from the mixers to the furnaces by means of the overhead crane. Provision has been made, however, for the later installation of a ladle transfer car at the rear of the furnace stage in order to relieve the overhead crane of this duty.

Scrap.—Scrap is delivered in box wagons to the main reception sidings located on the south-west perimeter of the works and is marshalled, as re-

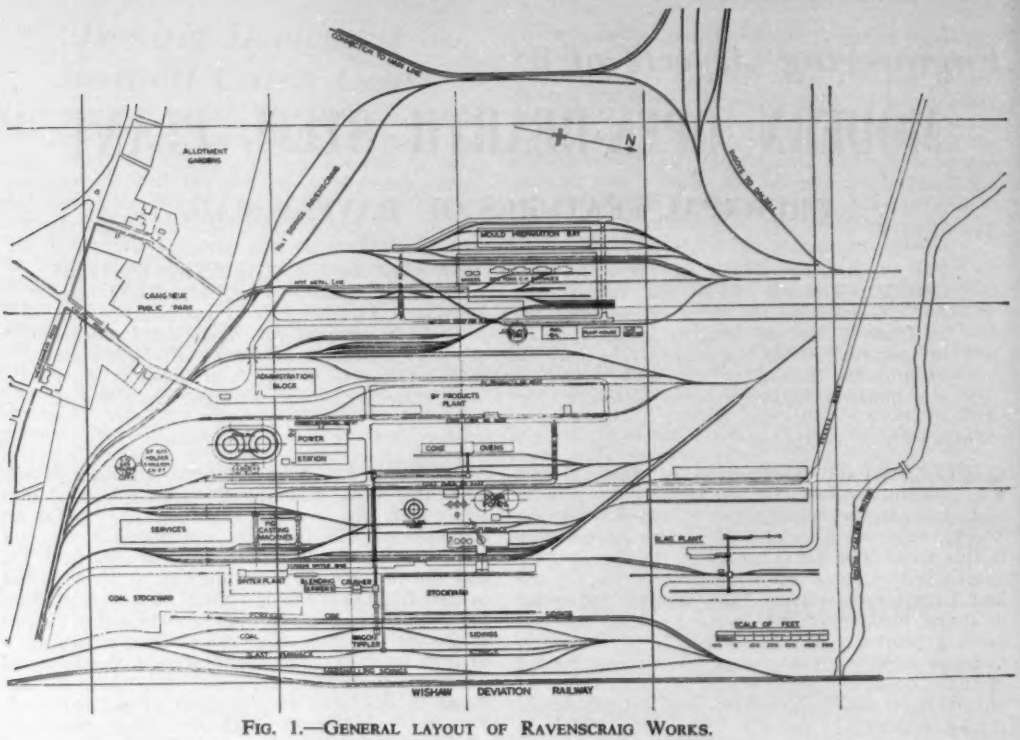


FIG. 1.—GENERAL LAYOUT OF RAVENSCRAIG WORKS.

quired, into the holding sidings on the east side of the melting shop; these are at an elevation of 297 ft. O.D., which is 3 ft. lower than stage level. The wagons are moved by locomotive from these sidings into the box-filling bay and an area adjacent to the sidings is available for the stockpiling of scrap which is not required for immediate consumption. Provision is also made for the delivery of scrap to the box-filling bay by road transport.

The box-filling bay accommodates four rail tracks, two for charging box cars at stage level and two for scrap wagons 3 ft. below stage level, this difference in levels ensuring that the top of the scrap wagons is in line with the top of the charging boxes, so minimizing crane hoist movement during box filling. The four rail tracks occupy approximately half the width of the box-filling bay, while the remainder is taken up by a scrap storage bunker extending the full length of the bay, being constructed of reinforced concrete heavily armoured on the inside faces with rails to safeguard the concrete against damage from scrap and magnets.

The scrap wagons are emptied by magnet crane directly into the charging boxes, each having a capacity of 45 cub. ft. or, alteratively, the scrap may be placed in the storage bunker. Scrap may also be taken from stock to the charging boxes. This facility is advantageous as it allows a better make-up of the furnace charge by giving greater flexibility in the choice of scrap. Benches are arranged alongside the box car rail tracks and provide easy access for the operator when trimming the scrap in the boxes.

When the charging boxes have been filled the train of cars is drawn out of the filling bay and over a weighbridge positioned on the entry rail tracks at the south end of the shop and, after weighing, the train is marshalled in the charge holding bay sidings, or, alternatively, it can be placed directly in front of any one of the furnaces for immediate charging.

Oxides and Fluxes.—Oxides and fluxes, which comprise ore, scale, limestone, lime, and fluorspar, are delivered over the same reception sidings as are provided for scrap and an extensive materials handling system has been installed at the south end of the shop to deal with these commodities expeditiously and with a minimum of labour. The box wagons are gravity fed over a tippler, which, in view of the nature of the materials to be handled, is enclosed in order to minimize dust nuisance, and the discharged material is taken by conveyor belt to any one of six high-level storage hoppers.

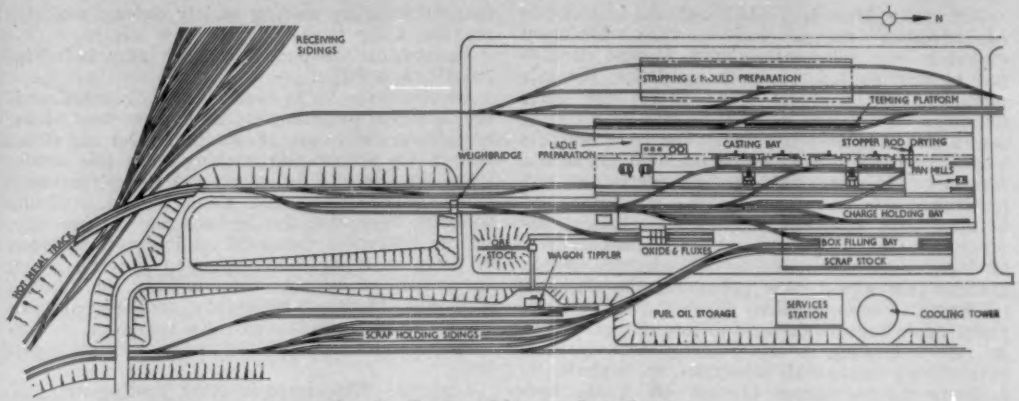


FIG. 2.—PLAN OF MELTING SHOP LAYOUT.

With the exception of ore, the supply of oxides and fluxes can be regulated so that sufficient bunker capacity is available to ensure continuity of operation. In the case of ore, however, it is often necessary to be able to accept a complete shipload and, to meet this condition, facilities have been provided for stockpiling the ore and reclaiming as required, both operations being carried out by means of a grab carried on an overhead telfer. Reclaimed ore is discharged through a feed hopper on to a secondary conveyor belt, which delivers it to the overhead storage bunkers. These are arranged over two rail tracks which connect with the stage railway system and cars of empty boxes are propelled by locomotive under the bunkers when oxides or fluxes are required. As in the case of scrap, the cars carrying the filled boxes are drawn southwards by locomotive over the weighbridge, weighed, and then marshalled in the charge-holding bay with the appropriate other charge materials or positioned in front of the furnaces for immediate charging.

Ferro-alloys and Ladle Additions.—These are delivered in box wagons directly into the charge-holding bay over a rail track located immediately adjacent to the furnace bay. The ferro-alloys and ladle additions plant is arranged alongside this track and comprises a jaw-type crusher discharging on to a belt conveyor which feeds a series of high-level storage hoppers positioned in the dead space formed by the line of columns between the charge-holding and furnace bays; alternatively, it is possible to by-pass the crusher, the material then being discharged from the incoming wagons through a chute directly on to the conveyor and thence to the storage hoppers.

As material is required, a portable skip is placed below the discharge gate of the particular storage hopper by means of a fork-lift truck and, after the desired amount has been fed into the skip, it is placed on an adjacent scale for weighing. All rails in the furnace bay have been arranged with their heads flush with the floor so that fork-lift trucks and other rubber tyred vehicles have complete freedom of movement in this area. It is possible, therefore, for the ladle addition to be moved to the launder platform at the rear of the furnace by means of fork-lift trucks, which are also capable of discharging the contents of the skips into feeding hoppers, one of which is provided adjacent to each furnace launder. By means of these hoppers, which have bottom-gate discharge, the additions can be fed through chutes at the desired rate into the ladle with little or no manual effort.

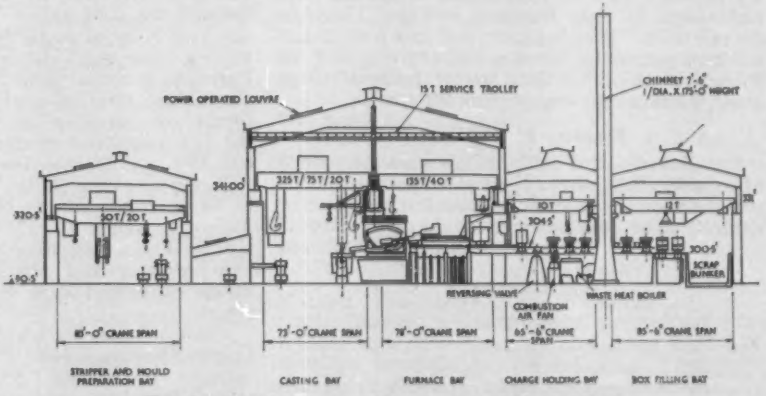


FIG. 3.—CROSS-SECTIONAL ELEVATION OF MELTING SHOP.

Refractory Materials.—Although the importance of adequate storage facilities for refractory materials was fully appreciated, it was decided not to provide separate accommodation for this purpose, but to create areas within the main buildings where such materials could be properly stored and efficiently handled. The most suitable location was considered to be the area below the furnace and charge-holding bay platforms and particular care was taken in the positioning of building and platform supporting columns, reversing valves, dampers and waste-heat boilers to leave the maximum amount of free, usable space. This aspect also influenced the decision to create a common floor level throughout the plant, the whole of the area below the platforms in the box-filling, charge-holding, and furnace bays, being laid with concrete or asphalt to facilitate the movement of fork-lift trucks and other rubber tyred vehicles.

Bricks are normally delivered on pallets by railway wagons into this area and are off-loaded and stored by means of fork-lift trucks, which are also used for the withdrawal of bricks from stock and their transference to the point of usage. A power-operated lift with a capacity of 10 tons and capable of accommodating a loaded truck is installed at approximately the mid-point of the melting shop for the movement of materials from ground to furnace platform and *vice versa.*

Crushed burnt dolomite is delivered to the works ready for use in 4-ton containers, three such containers being carried on special BTC wagons. These wagons are received at ground level at the north end of the furnace bay, where provision has been made for the handling of dolomite, mortar, and parging materials. Most of the dolomite containers are emptied at this point directly into the removable hoppers of the fettling machine, which are transferred along the furnace bay by one of the hot-metal ladle cranes; alternatively, the dolomite may be taken and deposited on the furnace stage for hand fettling.

Materials for the preparation of mortars, etc., are delivered by box wagon, also at ground level and stored in floor bunkers arranged alongside the rail track. They are processed in a jaw crusher and two pan mills, one wet and one dry, and the finished material is moved to the point of usage in skips either by crane or fork-lift truck.

Features of Buildings

The dimensions of the buildings were determined by considerations of the plant and equipment to be accommodated, and leading particulars are given in Table 1. The buildings are, for the most part, of riveted and bolted construction, this being chosen in preference to welding mainly to suit available manufacturing facilities.

TABLE 1.—*Particulars of Building.*

Location.	Crane span.	Length.
Box-filling bay	83 ft.	462 ft.
Charge-holding bay	60 ft.	854 ft.
Furnace bay	78 ft.	910 ft.
Casting bay	73 ft.	910 ft.
Stripping and mould preparation bay ..	83 ft.	504 ft.

Features of the buildings which may be of interest are as follow:—

Ventilation.—As is well known, ventilation is best achieved by arranging the highest point of the roof above the source of maximum heat and fume, and in an open-hearth melting shop this occurs along the line of the furnaces. A ridge-type ventilator has been arranged along the apex of the common roof over the furnace and casting bays and an additional means of ventilation is provided in these roofs by motor-operated louvres, which are controlled by push buttons from the furnace platform. In the stripping bay, ventilation is also by means of a continuous ridge ventilator, motor-operated louvres in the roof and spaced side sheeting.

Lighting.—Experience in other melting shops of the company indicated the futility of providing glazing in the roofs of furnace and casting bays, as even with considerable effort it is difficult to keep the glass clean. Reliance has, therefore, been placed on the opening louvres already mentioned and vertical glazing on the side of the bay remote from the furnaces. In the box-filling and charge-holding bays continuous ridge mansards with glazing on all four faces have been incorporated, and vertical glazing has been arranged in the outer wall of the box-filling bay.

Accessibility.—Particular attention was paid when designing the buildings to ensure easy access to all parts in order to facilitate maintenance not only of the buildings themselves but also of items of plant. Staircases, not ladders, have been provided for safe access from ground to furnace and teeming platforms and from these points to crane gantries and roofs; walkways are also installed in the roofs for the servicing of electric light fittings and for access to gutters for cleaning purposes.

Also for reasons of safety, the minimum clearance between the end carriages of overhead travelling cranes and roof shafts is 21 in. excepting in the case of the column line between the furnace and casting bays where a walkway has been created through the roof shafts. These features obviate any possibility of accident by crushing between a moving crane and a stationary part of the building. Provision has also been made for safe access to glazing for cleaning purposes and movable platforms are arranged in the ridge mansards of the box-filling and charge-holding bays to facilitate this maintenance operation.

Fixing of Crane Rails.—In view of the extremely heavy cranes in use in the main bays, a rail having a weight of 375 lb./yd., has been provided. These rails have square cut joints butted tight together and attached to the girders by means of welded clips with side locating wedge pieces.

Girders over Furnaces.—In order to ensure ample clearance around the furnaces, the adjacent columns on the line between the furnace and casting bays have been arranged at 112-ft. centres.

This has resulted in the gantry girders being of such a weight and size that they could not be finish fabricated in the shops and their transport to the site would have created many problems. They were, therefore, made in two pieces and jointed at the side by means of heavy splice plates and bright turned bolts inserted in shop reamered holes. The girders are made entirely of Ducol W.21 high-tensile steel stressed to about 11 ton/sq. in.

Cranes.—Particulars of cranes and charging machines are given in Table 2.

TABLE 2.—*Particulars of Cranes and Charging Machines.*

Location.	Type.	Capacity.	No.	Span.
Stripping and mould-preparation bay	Service crane	50/20 tons	1	83 ft.
Stripping and mould-preparation bay	Stripper crane	400/40 tons	1	83 ft.
Box-filling bay ..	Magnet crane	12 tons	2	83 ft.
Charge-holding bay	Service crane	10 tons	1	60 ft.
Casting bay ..	Ladle crane	325/75/20 tons	2	73 ft.
Furnace bay ..	Ladle crane	135/40 tons	2	78 ft.
Furnace bay ..	Ground charger	10 tons	2	30 ft.

Melting Shop Furnace Equipment

Although one inactive mixer is quite capable of supplying the shop with hot metal, two 800-ton capacity vessels have been provided to ensure continuity of operation during relining periods. Particulars of the mixer lining are as follow: Body: 6½ in. Amberlite No. 12 insulating brick; 6 in. 42/44 per cent. Al_2O_3 firebrick; 16½ in. magnesite. End: 6 in. Amberlite No. 1 insulating brick; 12 in. 42/44 per cent. Al_2O_3 firebrick; 16½ in. magnesite. The mixers are fired with coke-oven gas from either end, the waste gases being exhausted directly into the shop through the charging door and the pouring spout. Provision is also made for firing with heavy fuel oil in the event of coke-oven gas not being available. Rotation of the vessel is by rack and pinion, which are electrically operated.

Open-hearth Furnaces.—At the time of their construction, the furnaces, which have a nominal tapping capacity of 250 tons, were the largest fixed furnaces in Europe and their design was influenced by American practice. Leading particulars of the furnaces are as follow: Overall dimensions, 86 ft. 6 in. by 25 ft.; hearth dimensions, 55 ft. 6 in. by 17 ft. 6 in.; hearth area 971.25 sq. ft.; ratio length/width, 3.17:1; hearth area/ton, 3.88 sq. ft.; bath depth, 2 ft. 9½ in.; roof height above foreplate, 8 ft. 7 in.; roof span, 22 ft. 6 in.; door openings, five doors 5 ft. by 4 ft. 6 in.; uptakes, two at 6 ft. 9 in. by 8 ft. 6 in.; uptake area/ton, 0.464 sq. ft.; slag pocket, 19 ft. by 22 ft. 7½ in. by 14 ft. 10¾ in.; slag pocket vol., 25.6 cu. ft./ton; regenerator chamber, 19 ft. by 29 ft. 9 in. by 32 ft. 6 in.; regenerator vol., 73.6 cub. ft./ton; flue area, 57.75 sq. ft. The furnace brickwork is as follows, furnace chamber roof, 15 in. to 18 in. silica rings; furnace chamber walls, 18 in. chrome magnesite; furnace hearth lining, 10 in. dolomite, 18¾ in. magnesite, 15 in. 42/44 per cent. Al_2O_3 and 1½-in. insulation; furnace uptakes, 18 in. magnesite chrome; furnace slag pockets, 28 in. silica; regenerator roof, hot end, 12 in. 50 per cent. Al_2O_3, cold end, 10 in. 42/44 per cent. Al_2O_3; regenerator walls, top, 23½ in. 42/44 per cent. Al_2O_3, mid. 35/37 per cent. Al_2O_3, bottom, 30/32 per cent. Al_2O_3 Ak backed with 4½ in. insulation; flues, 9 in. 30/32 per cent. Al_2O_3 and 4½ in. insulation.

Particular attention was paid to the design of the binding to ensure stability of construction and permanence of furnace shape. The regenerator chambers are bound vertically and horizontally and are plated to facilitate bricking and to minimize air infiltration. At the slag pockets the steelwork is carried under the base of the pockets and tied to the vertical members to give added strength at these points, should it be necessary to use explosives for loosening the slag. Also to ease the removal of slag the binding adjacent to the casting bay is arranged to allow full width access to the pockets thus permitting the use of mechanical shovels for this duty.

The hearth and upper furnace steelwork is of exceptionally heavy construction and is made up of steel castings, slab buckstays having a cross section of 18 ft. by 6 in., and joist and channel ties. It is carried on two steel trestles arranged at wide centres to give maximum free space for the handling of slag and refuse between the casting and furnace bays.

The design of the flue system was influenced by the results of experimental work carried out on a perspex model of the furnace, which showed that with conventional layouts the distribution of air and waste gases in the regenerator chambers was not satisfactory. These experiments also confirmed what has long been an established principle of hydraulics, that a right-angled bend with vanes has less pressure drop and gives better distribution than a radiused bend. The flue system has been based on this principle and the operational results have justified the decision.

Each furnace is equipped with a single drum fire tube waste-heat boiler 12 ft. 6 in. dia. by 14 ft. long with economizer. The boilers are fitted with superheaters and operate at a pressure of 265 lb./sq. in., the temperature of the steam being 700 deg. F.

Water cooling is applied to doors, door frames, front buckstays, burners and burner ports, reversing valves, and isolating dampers. All piping and valves are positioned for ease of maintenance and accessibility in the event of damage. The furnaces are fully instrumented.

Instrumentation

The furnaces are equipped as follow:—*Indicating Instruments.*—Pressure: oil, steam, and coke-oven gas; temperature: oil and steam. *Indicating and Recording Instruments.*—Pressure: furnace chamber; draught; chimney; quantity flow; oil,

coke-oven gas, air and steam; temperature: furnace roof, regenerator roofs, flues, and liquid steel. *Regulating and Controlling Instruments.*—Ratio control: oil, coke-oven gas, fuel/air; pressure control: furnace chamber; temperature control: furnace roof.

Services.—In order to economize in labour and to facilitate supervision, all services have been segregated in an area on the east side of the shop.

Water.—Cooling water is supplied from the river Clyde via a high-level distribution tank located outside the works and after passing through sand filters is introduced as make-up into the furnace cooling system, being subsequently cooled and recirculated.

Fuel Oil.—All fuel oil is delivered by road tank cars, which are self-discharging into two 40-ft. dia. by 40-ft. high-storage tanks. The oil is circulated by electrically driven reciprocating pumps through a ring main from which connections are taken to each furnace. Steam heating is used to maintain the oil at the desired temperature for atomization and all oil pipes are steam tracered.

Compressed Air.—Compressed air for general works use is generated at 100 lb./sq. in. by two 1,000 cub. ft./min. rotary compressors, one being a stand-by unit.

Oxygen.—Liquid oxygen enters by road vehicle to the north end of the main service area; from this point it is piped to the consumer.

Boiler Feed Water.—This is supplied from the central treatment plant at the works power station via independent feed pumps in the melting shop services station. Provision is made for the use of ordinary domestic water in an emergency.

Ladle Preparation.—The preparation of all Kling, hot metal transfer, and steel ladles is concentrated at the south end of the casting bay. A concrete lined pit is provided for the accommodation of the ladles during bricking and is served by two swinging jib cranes which are attached to the building steelwork between the furnace and casting bays. Ladle refractories are stored under the furnace bay platform adjacent to the repair pit. Ladle driers fired by coke-oven gas are used. The preparation of ladle stoppers is carried out at the north end of the furnace bay at a point adjacent to the mortar and parging materials preparation plant. A reeling machine is provided for straightening the stopper rods, benches for assembly purposes, and coke-oven gas-fired continuous furnace for drying.

Slag and Skull Handling.—Both flushing and tapping slag is run directly into shallow pits at the furnaces and water cooled by spraying, thus dispensing with the use of slag pots. After solidifying, the slag is broken up by power-operated shovel, loaded into 20-ton capacity Euclid trucks, and taken out of the shop for disposal. Skulls are removed from the casting bay on flat-topped wagons and transferred to the skull breaker plant.

Casting and Stripping.—All ingots are cast on double bogey cars of welded construction, having a maximum carrying capacity of 100 tons. The steel ladles are double stoppered and it is normal practice to teem two ingots simultaneously. After teeming, the ingot cars are drawn out of the casting bay and propelled into the stripping bay alongside. The stripped ingots are placed in heat-insulated cars for transfer to the soaking pits at the Dalzell Works, a distance of about one mile; they are weighed *en route.*

Miscellaneous.—Comprehensive amenity facilities are provided under the box-filling bay platform for melting-shop personnel. An administration building is located at the south end at furnace platform level as well as local office accommodation adjacent to the furnaces and teeming stages, respectively.

Recommended Heights of Industrial Chimneys

ENGINEERS responsible for the design of new factories are frequently faced with difficulty in deciding the height of chimneys to disperse adequately the discharged gases and residual dust. Under the Clean Air Act, local authorities must approve the height of new chimneys. In a paper on "Recommendations on Heights for New Industrial Chimneys," presented at a meeting of the Institute of Fuel in London on May 23, the author, G. Nonhebel, pointed out that the major consideration was the effect of the discharge at ground level. Formulæ had been used for some years for calculating the gas concentration and rate of dust fall under normal weather conditions.

From a review of available information, recommendations are now made that the height of a new chimney serving a large plant should be such that the calculated 3-min. maximum concentration of sulphur dioxide at ground level should not exceed 40 parts/100,000,000 in areas of heavy industry or high housing density and 50 parts/100,000,000 in other areas. Similarly, the calculated maximum rate of deposit of grit and dust from a new chimney should not exceed 1,000 g/100 m^2/month with a wind direction constant within an octant. The formulæ proposed are not applicable to emissions from relatively low chimneys serving small plants; consequently, recommendations based on experience are made for a sliding scale of heights from 10 to 120 ft. for boiler plants of aggregate capacity 5,000 to 33,000 lb./hr.

Mr. Nonhebel said that worked examples showed that rate of dust deposit rather than ground-level concentration of SO_2 was usually the factor which should control the height of boiler plant chimneys. Prevention of emission of particles or aggregates larger than 76 microns was most important. Additional factors meriting consideration were:—(*a*) Rate of ground coverage by a film of deposited dust (<0.04 per cent. per day suggested); (*b*) distance from the chimney at which dusty plumes became substantially invisible (three chimney heights suggested).

Visiting a Colliery

Intended primarily for the person unfamiliar with the industry, "Visit to a Coal Mine," published by the National Coal Board, achieves its objective admirably. It describes a visit to one of the most modern mines in the country and wisely emphasizes that not all mines are like the one described. The story is well presented and is accompanied by many excellent photographs.

NCB REPORT AND ACCOUNTS FOR 1959

Accumulated Deficit is Now £56,584,000

Operating profit of the National Coal Board for the year ended January 2, 1960, was £13,176,000, compared with £19,126,000 in the previous year. After deducting £36,841,000 (£32,106,000) for interest payable to the Minister of Power and £300,000 for other interest, the deficiency for the year was £23,958,000 (£3,449,000), which raises the accumulated deficit of the board to £56,584,000 (£32,626,000). Productivity reached a record level at an average for all workers of 1.332 tons a shift—5.3 per cent. higher than in 1958. In spite of extra costs, the increase in productivity and operational efficiency was sufficient to bring about a reduction of 1s. 6d. a ton in average costs over the year, states the board's annual report.

MAIN task of the National Coal Board in 1959 was, as in 1958, to regulate output to conform with a sharp fall in consumption. Primary objectives were to reduce output without undue harm to future productive capacity, without a crippling loss of revenue, and without severe harm to the mining community. Productive capacity has been maintained over the last three years and by 1965 will be capable of meeting the demand assumed in the "Revised Plan for Coal" of 200,000,000 to 215,000,000 tons, mostly from new and reconstructed collieries. The labour force has been reduced by 70,000, but only 1,300 of the men who worked at the 53 collieries which closed in 1959 were left without alternative employment at the end of the year.

The cut in open-cast production from 14,300,000 tons in 1958 to 10,800,000 tons in 1959 resulted in severe loss of profit, but lessened the effect on the deep mines of fall in demand.

Answering the Critics

At the end of 1959 undistributed stocks amounted to 36,000,000 tons. The board was criticized for not selling coal in stock at reduced prices, but demand for coal is relatively unresponsive to short-term price changes, and consumption would not have increased substantially if coal had been offered at bargain prices. Selling stocks at bargain prices would have cost millions of pounds of revenue, while stocking current production at the same time as coal was being lifted from stock would have entailed heavy additional expenditure.

The stocking of coal and coke (including the cost of putting to stock, interest charges, and provision for deterioration, and lifting and preparing for sale) is estimated to have cost some £27,000,000 in 1959. This expenditure exceeded the deficiency for the year by about £3,000,000.

The board held the inland price of coal steady throughout the year. Export business was very difficult in face of competition from Poland, which was prepared to sell in effect at any price. American coal in Europe was still highly competitive.

Production in 1960 will be reduced so that if demand reaches the estimated figure there will be no net addition to undistributed stocks over the year. It is expected that output per manshift will increase still further.

After considering estimates from the various classes of consumer, the board's view is that total demand in 1960, including exports, will be about 196,000,000 tons. To avoid stocking, maximum output is planned at 195,000,000 tons, including 7,000,000 tons of open-cast coal. Additional supplies of some Welsh anthracite and low-volatile coals will be obtained if possible to meet the unsatisfied demand. The reduction in deep-mined output will be achieved partly by closing about 45 collieries with a current annual output of 4,800,000 tons, and partly by closing coal faces or districts in some mines and working others on only one shift a day.

The labour force will be further reduced by allowing natural wastage to outrun recruitment. Some 17,000 men are employed at the collieries to be closed. By retiring men over 65 and restricting recruitment at nearby collieries, it is hoped to find work within the industry for most of the men. Discussions with the unions were held to frame programmes for closures so as to keep redundancy to a minimum.

As part of its plan to keep production down, the board thought it right to seek a reduction of output from the small mines. Discussions with the Federations of Small Mines of Great Britain began before the end of the year.

Measures to reduce output during 1960 may be expected to increase costs of production. The board looks to the continued rise in productivity to offset these extra costs. Moreover, non-operational expenditure will be controlled at a level below that of 1959, and there will be a further reduction in the number of non-industrial staff.

Marketing

Coal consumption in 1959 was 12,500,000 tons less than in 1958. Of this reduction 9,000,000 tons came in the first six months. But for the warmer weather coal consumption would probably have been 3,000,000 tons higher. After due allowance is made for weather and for higher efficiency in the

use of coal it is clear that the coal industry did not fully benefit from the revival of industrial activity during the year. Power stations sent out 7 per cent. more electricity than in 1958, but consumed slightly less coal mainly because more oil—equivalent to 2,700,000 tons of coal—was used. In 1959 power stations in all used oil equivalent to about 7,000,000 tons of coal. During the year agreement was reached with the Central Electricity Generating Board and oil companies to defer for one year the conversion to oil firing of boilers at two power stations, but negotiations for other dual-fired stations (at present using oil) to revert to coal had not met with success by the end of the year. In the gas industry production was 2.7 per cent. less than in 1958, but the gasworks used 9 per cent. less coal, equivalent to 2,250,000 tons, mainly because more oil and more refinery gas were used in gas production. Oil consumption in "general industry" increased by the equivalent of 2,500,000 tons of coal.

Coal in Competition

To maintain its present share of the market and get new business, coal must compete strongly with other fuels. Coal is too often blamed for troubles caused by the age and inefficiency of the coal-burning appliance. False comparisons are made between obsolete coal plants and the latest oil-burning plant. Competition with oil has become intense in recent years and the board considers that a comprehensive after-sales service as effective and attractive as that offered by producers of other fuels is needed. To provide regular service and advice from well-qualified technical and commercial representatives the board undertook in 1959 a big expansion of its sales service. About 80 additional staff were recruited of whom 30 are well-qualified fuel technologists. Regular visits are being made to consumers' premises to help with their problems. The board is confident that the new service, which is free of charge, will help consumers to realize the advantages of solid fuel as a cheap and dependable source of energy. Calls on the service by consumers have been increasing rapidly.

The board supplemented these efforts with general publicity: national Press advertising publicized the use of coal by prominent industrial consumers; and there was extensive advertising of coal fires in the home by the Coal Utilization Council, which also advertised the advantages of solid-fuel central heating systems, which are cheaper to install and operate than oil-fired equipment. The board will do all it can to ensure that solid smokeless fuel is used in smoke-control areas, but many districts will not become smoke-control areas, and in these there will continue to be a place for an open fire burning house coal.

To compete effectively coal must be consistent in quality and prices must be stable. The general level of pithead prices has been held steady since July, 1957, and continued increases in productivity help to keep prices stable.

Although modern industrial appliances burning coal are just as smokeless in operation as oil-burning appliances, coal has lost ground to oil because of the misguided idea that with coal it is more difficult to comply with the Clean Air Act. Following representations from the board, an Order under Section 11(4) of the Clean Air Act was made by the Minister of Housing and Local Government in July, 1959. The Order gives general exemption to those coal-burning appliances (other than those using pulverized fuel) fired by mechanical stokers and installed since December 31, 1956. This change has since been made effective in Scotland also. The Minister also asked local authorities to give individual exemptions to coal-burning appliances installed before December 31, 1956, where these are capable of working as smokelessly as those exempted by the Order, and reminded local authorities that pulverized fuel furnaces are capable of almost smokeless operation.

Development and Testing of Appliances

The board is collaborating closely with appliance manufacturers in the development of more efficient coal-burning appliances. The British Coal Utilization Research Association, to which the board contributed £140,000 in 1959. is developing firing appliances, particularly automatic controls, for industrial shell boilers. A fuel-air controller for chain grate stokers will soon be ready for commercial development. The BCURA has developed a miniature chain grate stoker to use

TABLE 1.—*Costs of Production, Proceeds, and Losses of Collieries for the Second Half-year of* 1959 *(Great Britain).*

	Tons.
OUTPUT OF COAL:	
Disposable commercially	86,171,230
Mine consumption ..	2,566,256
Miners' coal	2,250,167
Saleable tonnage from NCB mines	90,987,653

	Amount.	Per ton saleable.
COSTS AND PROCEEDS:	£	s. d.
Wages (including holiday pay, sick pay, and allowances in kind) ..	215,892,736	47 5.5
Roof supports, general stores, and repairs ..	63,577,989	13 11.7
Coal and power consumed	18,559,169	4 0.9
Other costs (including depreciation)	82,804,122	18 2.4
TOTAL COSTS	380,834,016	83 8.5
PROCEEDS	375,468,865	82 6.4
Loss (before charging interest)	Loss 5,365,151	Loss 1 2.1

AVERAGE EARNINGS (ALL AGES):	Cash earnings.	Value of allowances in kind.	Total.
Per manshift worked:	s. d.	s. d.	s. d.
At the face	76 2.6	3 10.4	80 1.0
All underground ..	64 9.4	3 6.3	68 3.7
Surface..	44 1.2	3 0.4	47 1.6
All workers	60 4.7	3 5.0	63 9.7*
Per wage-earner per week:	s. d.	s. d.	s. d.
At the face	313 10	15 11	329 9
All underground ..	287 1	15 7	302 8
Surface..	221 7	15 2	236 9
All workers	274 6	15 6	290 0*

* The estimated average earnings in the industry, including the value of allowances in kind, in Great Britain for all adult male workers, 21 years of age and over, in the second half-year 1959, amounted to 66s. 3d. per manshift worked and 302s. 7d. per week.

small coal in central-heating systems, and a prototype has worked successfully in a London block of flats. In March, 1959, the board and the Gas Council took over responsibility for testing domestic solid fuel grates and stoves. A Domestic Solid Fuel Appliances Approval Council was set up, with representatives of the coal, gas, and coking industries, appliance manufacturers, and the Ministry of Power.

Stocking

The board's stocks of coal rose from 19,500,000 tons to 35,700,000 tons during the year. Because coal is produced at a fairly even rate throughout the year, and consumption declines in the summer, it is necessary for distributors and consumers to build up stocks during the summer to guard against distribution difficulties during the winter. Discussions with the trade and other interested parties on a scheme to encourage seasonal stocking in industry continued in 1959, but because of wide divergencies of opinion the board decided that no satisfactory proposals could be devised, for the present at any rate. Householders are encouraged to stock in the summer when prices of house coal are reduced.

Keen competition persisted in 1959 in all export markets. To retain business and find new outlets, prices were reduced wherever it seemed possible to get worthwhile business in the face of competition. Exports and bunker shipments amounted to 4,300,000 tons, about 500,000 tons less than in 1958.

TABLE 2.—*Costs of Production, Proceeds, and Profit of Collieries for the Year* 1959 (*Great Britain*).

	Tons.	
OUTPUT OF COAL:		
Disposable commercially	181,938,164	
Mine consumption ..	5,612,177	
Miners' coal	4,942,827	
Saleable tonnage from NCB mines	192,493,168	

COSTS AND PROCEEDS:	Amount. £	Per ton saleable. s. d.
Wages (including holiday pay, sick pay, and allowances in kind) ..	456,141,629	47 4.7
Roof supports, general stores, and repairs ..	131,346,372	13 7.8
Coal and power consumed	39,142,579	4 0.8
Other costs (including depreciation)	166,425,915	17 3.5
TOTAL COSTS	793,056,495	82 4.8
PROCEEDS	803,087,371	83 5.3
PROFIT (before charging interest)	10,030,876	1 0.5

AVERAGE EARNINGS (ALL AGES):	Cash earnings. s. d.	Value of allowances in kind s. d.	Total. s. d.
Per manshift worked:			
At the face	76 0.6	3 11.3	79 11.9
All underground ..	64 8.8	3 7.4	68 4.2
Surface..	44 2.4	3 1.6	47 4.0
All workers	60 4.7	3 6.1	63 10.8*
Per wage-earner per week:	s. d.	s. d.	s. d.
At the face	325 8	16 10	342 6
All underground ..	296 11	16 7	313 6
Surface..	228 3	16 2	244 5
All workers	283 9	16 6	300 3*

* The estimated average earnings in the industry, including the value of allowances in kind, in Great Britain for all adult male workers, 21 years of age and over, in the year 1959, amounted to 66s. 5d. per anshift worked and 313s. 11d. per week.

Production in 1959

Saleable output in 1959 was 206,100,000 tons, 9,700,000 tons less than in 1958 and the lowest since 1947. The board's task was to reduce output and improve operational efficiency at the same time. The productivity of all workers in 1959, at 751 manshifts a thousand tons, was the best ever recorded in the coal-mining industry. Deep-mined output was 195,300,000 tons, including 2,700,000 tons from licensed mines, compared with 198,800,000 tons, including 2,600,000 tons from licensed mines, in 1958. There were 536 licensed mines at the end of 1959, compared with 562 at the end of 1958.

In the 1958 report the board described proposals to close 36 uneconomic collieries. By the end of 1959, 34 of these collieries had been closed completely and two partly closed. A further 19 were closed during the year either because their reserves were exhausted or as part of schemes of concentration and reorganization.

The labour force was reduced by over 4,700 men, largely by allowing normal wastage to outrun recruitment. Absence rates in 1959 were the highest in any year since the vesting date. The rate for all workers, including absence through sickness and accidents, was 14.69 per cent., compared with 14.14 per cent. in 1958. The figure for faceworkers was 16.95 (16.39) per cent. The amount of coal lost through unofficial stoppages and restrictions was 973,000 tons, the lowest amount since 1950. Because of the board's policy of running down open-cast contracts as quickly as existing contracts permit, open-cast output in 1959, at 10,800,000 tons was 3,500,000 tons less than in 1958, and profits fell from £8,200,000 in 1958 to £3,900,000 in 1959.

Productivity

The significant increase in productivity was achieved through greater all-round efficiency. Better power-loading results helped to raise coal-face productivity. The benefits of reconstruction were increasingly felt, and closure of some collieries whose productivity was very low also made a small contribution to the general improvement. Divisionally, the greatest improvements were in the Scottish, North-Western, North-Eastern, and South-Eastern divisions. In the East Midlands, where productivity was already the highest in the country, it improved still further.

The amount of coal got and loaded mechanically was 72,600,000 tons, 7,000,000 tons more than in 1958 and 32 per cent. of total output. The improvement in productivity on power-loaded faces was marked; 154 face manshifts were worked for each 1,000 tons of mechanized pithead output in 1959, compared with 165 in 1958. The board continued its policy of using more trepanners and plough-

type machines in seams which are important sources of house coal. Work on measures to increase still further the efficiency of mechanized mining continued at the board's Mining Research Establishment and Central Engineering Establishment.

There were further modifications of the cutting and loading characteristics of the Anderton shearer loader to produce a higher proportion of large coal. There were successful tests on an experimental ripping machine (for mechanizing the advance of underground roadheads) and this is to be further developed in 1960.

The number of full or partial installations of self-advancing roof supports rose from 35 at the end of 1958 to 75 at the end of 1959. In suitable conditions, these lead to considerable savings. Experiments were continued on the remote control of coal-face support systems, a self-advancing support is being developed for roadheads, and three instruments to help in strata control went into commercial production during the year.

Fuel Efficiency

The board's Fuel Efficiency Service is carrying out an investigation in six selected areas which will, it is hoped, point the way to securing further increases in fuel efficiency at collieries. In 1959, colliery power, heat, and light costs were 5.5 per cent. of total production costs, compared with 5.7 per cent. in 1958.

The three pilot systems of electronic data processing made good progress in 1959. The installation in the North Staffordshire Area was outstandingly successful. By the end of the year it had taken over the paybill of all the 22,500 colliery workers in the Area.

The board is investigating the possibility of establishing one installation in each division to provide an integrated data processing service for several Areas.

Coal Preparation

The board continued to improve coal preparation techniques. During the year 24 new coal preparation plants with a capacity for treating over 13,000,000 tons of coal a year began operating, and by the end of the year 54 other plants with a total capacity of about 40,000,000 tons a year were in various stages of design or construction. Since 1947, 273 plants costing nearly £60,000,000 have been built and 135 froth-flotation units for cleaning fine coal have been put into operation. Because of its higher efficiency, much greater use is being made of the dense-medium system in new preparation plants.

The proportion of large coal produced fell slightly, but demand was satisfied. The board has helped to arrest the decline in large coal produced by paying careful attention to shotfiring, coal-cutting, and transport practices, and extending the use of alternatives to conventional explosive. Over 40 sets of compressed-air blasting equipment were

TABLE 3.—*Costs of Production, Proceeds, and Profit or Loss of Collieries for the Second Half-year of* 1959.

	Scottish Division.	Northern (N & C) Division.	Durham Division.	North-Eastern Division.	North-Western Division.	East Midlands Division.	West Midlands Division.	South-Western Division.	South-Eastern Division.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
OUTPUT OF COAL:									
Disposable commercially	8,217,669	5,835,385	10,469,580	18,556,760	6,222,015	20,426,941	6,763,293	8,947,521	732,066
Mine consumption ..	288,273	61,906	140,472	760,027	222,130	500,675	249,432	320,979	22,362
Miners' coal	210,106	187,512	430,815	531,708	115,448	349,352	161,190	246,746	17,290
Saleable from NCB mines	8,716,048	6,084,803	11,040,867	19,848,495	6,559,593	21,276,968	7,173,195	9,515,246	771,718
	Per ton saleable. s. d.	Per ton saleable. s. d.	Per ton saleable. s. d.	Per ton saleable. s. d.	Per ton saleable. s. d.	Per ton saleable. s. d.	Per ton saleable. s. d.	Per ton saleable. s. d.	Per ton saleable. s. d.
COSTS AND PROCEEDS:									
Wages (including holiday pay and allowances in kind)	57 3	51 4.4	60 0.2	43 8.1	49 6	34 1.3	45 4.9	58 0.7	62 4.0
Roof supports, general stores, and repairs ..	16 11.4	14 11.9	14 0.2	13 3.0	15 6.6	12 5.4	14 6.5	13 8.6	16 11.3
Coal and power consumed	4 9.5	3 0.7	3 11.0	3 11.3	4 7.2	2 8.9	4 1.1	6 11.2	7 0.6
Other costs (including depreciation)	23 0.2	17 8.6	20 1.1	15 1.5	24 3.3	13 9.8	20 7.1	22 1.1	18 10.0
TOTAL COSTS	102 0.1	87 1.6	98 0.5	75 11.9	93 11.1	63 1.4	84 7.6	100 9.6	105 1.9
PROCEEDS	85 1.5	81 0.3	93 9.9	80 9.6	86 10.4	69 1.3	81 0.4	98 5.4	99 1.2
PROFIT OR LOSS (before charging interest) ..	Loss. 16 10.6	Loss. 6 1.3	Loss. 4 2.6	4 9.7	Loss. 7 0.7	5 11.9	Loss. 3 7.2	Loss. 2 4.2	Loss. 6 0.7
(*a*) MANSHIFT AND (*b*) AVERAGE WEEKLY EARNINGS (including value of allowances in kind):	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
At the face .. (*a*)	76 2.9	85 5.2	78 1.6	83 7.6	78 6.3	91 0	80 2.6	66 10.6	90 8.8
" " .. (*b*)	318 8	368 8	338 2	326 6	324 5	371 0	319 7	280 10	352 3
All underground (*a*)	65 6.9	71 2.3	67 6.5	70 1.1	66 3.7	74 6.4	67 5.5	61 10	73 9.5
" " (*b*)	290 11	324 6	308 4	303 11	290 10	333 5	292 6	271 7	316 2
Surface .. (*a*)	44 1.9	48 1.6	48 11.3	46 5.8	46 11.0	48 7.7	46 4.3	46 10.8	47 5.3
" .. (*b*)	212 0	244 8	234 1	240 8	241 7	248 10	227 2	238 8	253 2
All workers .. (*a*)	61 6.9	66 1.3	64 0.2	64 11.6	62 3.4	68 9.8	62 0.2	58 6.9	68 2
" " .. (*b*)	277 2	308 4	294 9	292 0	281 11	316 8	277 2	265 2	304 10

TABLE 4.—*Costs of Production, Proceeds, and Profit or Loss of Collieries for the Year* 1959.

	Scottish Division.	Northern (N & C) Division.	Durham Division.	North-Eastern Division.	North-Western Division.	East Midlands Division.	West Midlands Division.	South-Western Division.	South-Eastern Division.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
OUTPUT OF COAL:									
Disposable commercially	17,376,926	12,175,426	22,049,514	39,138,868	13,267,430	42,737,168	14,487,091	19,181,606	1,524,135
Mine consumption ..	647,056	133,642	333,835	1,630,447	489,922	1,083,736	540,846	706,356	46,337
Miners' coal	475,419	413,062	937,891	1,135,792	259,453	770,630	347,005	564,186	39,389
Saleable from NCB mines	18,499,401	12,722,130	23,321,240	41,605,107	14,016,805	44,591,534	15,374,942	20,452,148	1,609,861
	Per ton saleable.	Per ton saleable.	Per ton saleable.	Per ton saleable.	Per ton saleable.	Per ton saleable.	Per ton saleable.	Per ton saleable.	Per ton saleable.
COSTS AND PROCEEDS:	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Wages (including holiday and sick pay and allowances in kind) ..	57 9.1	51 4.1	59 9.6	42 5.4	49 5.8	33 11.0	45 4.3	57 9.1	62 7.6
Roof supports, general stores, and repairs ..	16 0.2	14 8.7	13 8.7	13 2.8	15 2.0	12 4.4	13 7.6	13 2.1	15 10.0
Coal and power consumed	4 9.8	3 0.4	3 11.3	3 10.7	4 7.6	2 8.8	3 11.4	6 11.1	6 11.2
Other costs (including depreciation)	21 8.0	16 10.3	18 10.9	14 4.2	22 5.3	13 2.7	19 1.5	21 7.7	18 8.0
TOTAL COSTS	100 3.1	85 11.5	96 4.5	74 11.1	91 8.7	62 2.9	82 0.8	99 6.0	104 8.0
PROCEEDS	86 0.4	82 0.6	94 5.1	81 6.9	88 3.3	70 1.4	82 3.2	98 6.0	100 8.3
PROFIT OR LOSS (before charging interest) ..	Loss 14 2.7	Loss 3 10.9	Loss 1 11.4	6 7.8	Loss 3 5.4	7 10.5	2.4	Loss 1 0.0	Loss 3 4.5
(*a*) MANSHIFT AND (*b*) AVERAGE WEEKLY EARNINGS (including value of allowances in kind):	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
At the face .. (*a*)	76 3.0	86 1.2	78 2.9	83 8.2	77 11.9	90 9.2	80 1.8	66 9.2	91 4.3
" " .. (*b*)	334 0	379 3	352 11	339 1	334 8	381 11	331 10	294 10	368 1
All underground (*a*)	65 6.7	71 8.6	67 9.6	70 2.5	66 0.0	74 7.3	67 3.4	61 10.7	74 2.4
" " (*b*)	304 1	333 1	321 3	314 2	299 8	342 10	301 11	284 4	330 7
Surface .. (*a*)	44 1.9	48 5.1	49 2.4	46 8.1	47 0.5	48 10.2	46 5.2	47 3.8	47 11.2
" .. (*b*)	221 6	249 10	245 1	246 5	248 10	254 1	233 6	249 9	262 1
All workers .. (*a*)	61 6.7	66 6.9	64 2.8	65 1.3	62 1.6	68 11.7	61 11.4	58 9.2	68 8.4
" " .. (*b*)	289 7	316 2	307 3	301 4	290 6	325 3	285 10	277 8	318 5

introduced, bringing the total to 84 by the end of the year.

The board is the second largest brick producer in the UK. In 1959, 485,000,000 bricks were made. At the end of 1958 the board had stocks of 20,000,000 bricks. As activity in the building industry increased in 1959, these stocks, and virtually the whole of the year's output, were disposed of. The brickworks made a profit of £427,533, compared with £273,472 in 1958.

Reconstruction

From the vesting date to the end of 1959, 278 schemes for new collieries or for major reconstruction at existing collieries had been approved at a total cost of £618,000,000; of these 127 had been substantially completed.

Borings for proving reserves continued off the Durham coast during 1959. A new method of underwater geophysical exploration was also used off the Northumberland and Durham coast. Following the success of the first surveys the equipment was transferred to the Firth of Forth and thence to the Cumberland coast. This is believed to be the first time that the technique has been employed for surveying undersea coalfields. It is basically similar to the marine echo-sounding device.

Nine new shafts were completed in 1959, bringing the total sunk since vesting date to 44. Work was in progress on 14 new shafts, and a further 16 shafts were being deepened or widened. Total shaft sinking completed by the board by the end of 1959 amounted to 79,500 ft. in depth, and 15,700 ft. remained to be sunk in shafts under construction. The two shafts at Parkside Colliery, completed early in 1959, were sunk at the highest rate ever recorded in Great Britain. The average speeds of sinking were 172.0 and 167.7 ft. a month. Over a depth of 1,800 ft. each shaft was excavated at average speeds of over 245 ft. a month. Tunnelling has also improved, due to better training of labour, the application of method study techniques, and better methods of mechanical tunnelling. The fastest rate of advance up to the end of 1958 (64 yd. in one week at Tower Colliery in the South-Western Division) was exceeded at three tunnels in 1959. An advance of 107 yd. in seven days was attained in 1959 at Bank Hall Colliery in the North-Western Division.

Capital Expenditure

Capital expenditure by the board in 1959 amounted to £112,000,000, £8,000,000 more than in 1958. Of this, £100,000,000 was spent on collieries and the rest on ancillary activities. Expenditure on major colliery schemes accounted for £63,000,000. This brought total capital expenditure in the industry since 1947 to £877,000,000 distributed as follows:—(i) £332,000,000 on colliery schemes—chiefly major reconstruction and new collieries; (ii) £365,000,000 on maintaining and replacing the industry's man-made assets; (iii) £143,000,000 on ancillary undertakings, such as coke ovens, by-product plants, and brickworks; (iv) £37,000,000 on new houses

for mineworkers in areas where local authorities could not provide sufficient housing.

By the end of 1959, the 127 completed major schemes accounted for £106,000,000 of the total expenditure on major reconstruction schemes since 1947. The rest, £226,000,000, was tied up in schemes in progress.

In 1959 the demand for blast furnace and foundry coke and also for domestic and industrial coke was less than in 1958. Total disposals, at 4,279,000 tons, were 521,000 tons less than in 1958, and stocks rose by 1,502,000 tons during the year to 4,822,000 tons. The capital goods industries were slow to recover from the 1958 recession and coke sales to blast furnaces were over 27 per cent. less than in 1958, although demand improved in the second half of the year. An agreement was reached between the British Coking Industry Association, of which the board is a member, the British Iron and Steel Federation, and the Council of Iron Producers, to help merchant producers of blast-furnace coke to retain a reasonable share of the market in times of low demand. Sales of foundry coke also improved during the second half of the year, but were 3 per cent. down on the whole year. As evidence accumulated that sales of some types of coke could not be expected to reach their former levels, the board decided to restrict output further.

Measures to Restrict Coke Output

During the year the board's coking plants produced 6,249,000 tons of coke and breeze; 367,000 tons of crude tar; 26,000,000 gal. of crude benzole; 65,000 tons of sulphate of ammonia; 15,000 tons of other ammonia products, and 55,000,000,000 cub. ft. of gas. The "Phurnacite" plant produced 645,000 tons of "Phurnacite" and 27,000 tons of crude tar. "Warmco" production totalled 167,000 tons. At secondary by-product plants 233,000 tons of crude tar and other material were distilled and 31,000,000 gal. of crude benzole and other material were rectified. In order to restrict coke production several coking plants were closed, others being operated at a reduced level. The measures were discussed with organizations representing management and men, and carried out with their full co-operation. About 400 men were displaced; by the end of the year all but very few had found other employment.

Because of long-term contracts to supply gas to Area Gas Boards, and the expense of working coke ovens at less than full capacity, it was not possible to restrict coke production in 1959 to match demand, and stocks accumulated, approaching 5,000,000 tons by the end of the year. The better trend in demand for blast furnace and foundry coke should mean no material addition to stocks in 1960, and, indeed, some stocks may be lifted.

Sales of "Phurnacite" have increased to such an extent since 1947 that the Aberaman plant has been extended to four times its original size. Demand increased again in 1959, and at the end of the year plans were being made to expand production still further.

Much of the effort of the board's Coal Research Establishment has been devoted to finding new processes for making high-quality smokeless fuels from low-cost non-coking coals. Two processes have reached the stage of pilot-scale development, and the board decided in 1959 to set up the Process Development Department to ensure that sufficient effort is concentrated on bringing these and other promising new processes for coal utilization as quickly as possible into commercial production. The board approved designs for a pilot plant to produce 120 tons of fuel a day by one of the new processes, and construction began in the autumn at Birch Coppice in the West Midlands Division. The plant is estimated to cost £1,000,000 and is expected to be ready for operation in the autumn of 1960.

A contract for design of a commercial plant has been placed. A pilot plant of similar capacity for the second process is to be built at Graigola in the South-Western Division in time for a market appraisal of the product in the winter of 1960-61.

The contract for installing a Ruhrgas slagging gasifier at Manvers Main coking plant in the North-Eastern Division was approved before the end of the year and work will begin in 1960. It will use low-grade coal to make producer gas for under-firing coke ovens. During the year the board co-operated with the West Midlands Gas Board in a study of coal supplies for the Lurgi gasification plant to be constructed at Coleshill (Warwickshire). The plant is expected to use 420,000 tons a year of non-coking coal from collieries in the West Midlands Division.

Manpower

In 1959 the board again faced the necessity to reduce the labour force. Serious redundancy was avoided by allowing natural wastage to outrun recruitment. Of the 26,400 recruits over one third were boys and only 3,000 adults were new to mining. By reason of deaths, retirements, and other wastage, 73,500 men left the industry. The average number employed was 664,500, compared with 698,800 in 1958. Most of the adult recruits were taken on in the West Midlands and South-Western divisions, where output is to be increased under the "Revised Plan for Coal" and manpower was falling more quickly than was desirable. The problem of maintaining a balanced labour force despite the rundown of manpower was overcome. Overall productivity reached record levels during the year.

About 16,000 men were employed at the 53 collieries which closed in 1959. At the end of the year only 1,300 men under the age of 65 remained unemployed. To help create vacancies for transferred men, agreement was reached during the year with the NUM that all mineworkers of 65 and over would retire by the end of March, 1960, and thereafter all men would retire at 65. Men who so retire will receive compensation according to length of service ranging from £107

to £203 for underground workers and from £89 to £197 for surface workers.

Seven pithead baths were completed in 1959, bringing the total to 700; £250,000 was spent on new canteens and improvements during the year, and at the end of the year 675 colliery canteens were in use. The board made grants of £1,000,000 in 1959 under the Miners' Welfare Act, 1952, to the Coal Industry Social Welfare Organization, which provides for the welfare and recreation of mineworkers, including sick and disabled men.

The Coal Industry Housing Association built 80 houses in 1959, nearly all to serve the new Bevercotes Colliery in the East Midlands Division. By the end of the year all miners' hostels had been closed; the need for these has been diminishing for some time.

Steps to Improve Safety

The year was unhappily marred by an underground fire at Auchengeich Colliery, in the Scottish Division, where 47 men were killed, and by underground explosions at Bickershaw Colliery in the North-Western Division and at St. John's and Walton collieries in the North-Eastern Division. In all there were 343 fatal accidents in the board's mines, 28 more than in 1958. Slightly fewer men were injured in reportable accidents, 2,025 compared with 2,037 in 1958.

The board has taken further steps to improve safety. First results of experiments begun in 1957 became available during the year. Under the scheme a safety engineer is appointed at each colliery to give special attention to the causes of accidents, and selected accidents are investigated by a local panel of officials and men directly concerned in them. Results were sufficiently promising to justify extending the scheme to two or three collieries in each division, and further extension will be considered if results justify it.

In May, 1959, the Coal Industry National Consultative Council approved the report of the subcommittee set up under the chairmanship of Sir Andrew Bryan to examine the causes and circumstances of recent mining explosions. The recommendations were accepted by the board, and the report was given wide publicity. A working party of experts was set up to examine the evidence available in this country and abroad on coal dust explosions, and the board took steps to implement other recommendations in the report.

By the end of 1959 there were 65 methane drainage installations draining about 135,000,000 cu. ft. of methane a week; about 50,000,000 cu. ft. a week was used at collieries or sold to Area Gas Boards.

Medical Service

Five mobile X-ray units were delivered to divisions in 1958, and four more were handed over early in 1959. By the end of the year 116 collieries employing nearly 103,000 men had been surveyed. About 79 per cent. of the men presented themselves for X-rays. It is planned to survey one fifth of the men in the industry each year, and a voluntary response of at least 80 per cent. is expected. Because of the large fall in recruitment the number of medical examinations of all new entrants fell from 25,131 in 1958 to 14,788 in 1959. There are now 368 colliery medical centres serving over 471,000 men, and the building programme is nearing completion. Smaller collieries are served by medical units. The board's 368 nursing sisters and 2,370 medical room attendants (883 full time and 1,487 part time) give over 5,000,000 treatments a year.

The regular X-ray examination of mineworkers which began in 1959 will disclose an appreciable number of cases of pneumoconiosis not previously diagnosed, and consequently in the first five years of the periodic X-ray scheme there will be an increase in the number of certified cases. The board's main medical research effort is still being devoted to pneumoconiosis. No conclusions can yet be drawn on the relationship between dust and pneumoconiosis. Research on miners' nystagmus has been discontinued, because improvements in underground lighting have steadily reduced the incidence of the disease and it is no longer regarded as a serious problem.

BLASTING METHOD USED IN WISCONSIN QUARRY

MASSIVE blasting operation in a Wisconsin trap rock quarry is described in a US Bureau of Mines publication (Information Circular 7913, "Coyote-hole Primary Blasting, Dresser Trap Rock Company, Dresser, Wis."). Known as the coyote-hole technique by the mining industry, the method involved the detonation of 20 tons of explosives in two simultaneous, but physically separate blasts. A quarter of a million tons of rock was broken—enough to keep the quarry busy more than a year, the bureau's report says.

In coyote-hole blasting, major charges of explosives are placed in "coyote-holes" or in tunnels parallel to the operating face. Such blasts usually are followed by secondary blasting, after which the rock is crushed and screened to small sizes.

The publication, written by Lawrence G. Marshall, a mine examination and exploration engineer, includes a brief account of the history and general operations of the Dresser Trap Rock Company in particular, and of trap-rock quarries elsewhere in the Central States. Most trap rock from this operation now goes into concrete and roadstone, railroad ballast, and filter stone for sewage-disposal plants.

Mining Journal's Annual Review

Contents of the Mining Journal Annual Review, 1960, come under six main headings—review of metals and minerals, technical progress, the world's mining fields in 1959, progress of individual companies, professional directory, and buyers' guide. There are many articles by specialized writers and a wealth of detailed information which will be of value to those interested in the wide field covered by the publication. Copies (21s., post free) may be obtained from the Mining Journal, 15, Wilson Street, London, E.C.2.

BUREAU OF ANALYZED SAMPLES

A RECORD number of over 80 analysts, representing all branches of the metallurgical industry, Government departments, and research association laboratories, attended a meeting in York held by the Bureau of Analysed Samples, Limited.

After an introductory welcome by Dr. E. Gregory, Mr. P. D. Ridsdale, the managing director, gave a report on the progress in the preparation of British chemical and spectrographic standards during the three-year period to November, 1959.

His report stated that during this period, the following five new standards had been issued:—A Refined Ferro-manganese (No. 280); a 13 per cent. Manganese Steel (No. 290); a Lincolnshire Iron Ore (No. 301); a Northants Iron Ore (No. 302), and an Iron Ore Sinter (No. 303). Preparation of the following eight new chemical standards was now in progress:— A 10 per cent. Aluminium Bronze; a 6 per cent. Zinc Aluminium Alloy; a 75 per cent. Ferro-silicon; a Magnesium Alloy containing Zinc and Rare Earths; a Nimonic "90" Alloy; a 0.4 per cent. Carbon Free-cutting Steel; a Chromium Ore, and a Sillimanite Refractory. The two latter samples were being prepared at the request of the British Ceramic Research Association and the 0.4 per cent. Carbon Free-cutting Steel was being prepared at the invitation of the Association of Drop Forgers and Stampers.

In addition to work on new samples, replacements of no fewer than 36 standards had been prepared and issued during this period. These included:—Three carbon steels; three alloy steels; three cast irons; four ferro-alloys; two basic slags; one iron ore, and eight low alloy steels.

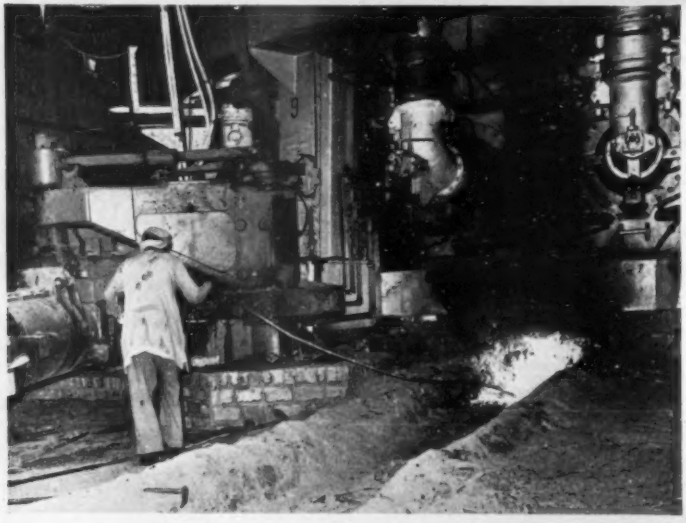
Mr. Ridsdale also announced that work on a further 10 replacement samples was in progress and that since the end of last year three of these had been completed and would be issued shortly:—A 0.3 per cent. carbon steel (No. 239/2); a 1.2 per cent. carbon steel (No. 163/1), and a bronze containing 3.5 per cent. Pb and 0.5 per cent. P (No. 183/1).

Turning to spectrographic standards Mr. Ridsdale reported that a new series of low-alloy steel spectrographic standards had been issued to replace the original series, which was now exhausted. This new series was issued in the form of both the 1-in. sq. section bars and 1¼-in. dia. discs to meet the requirements of the spectrograph and all forms of direct-reading instruments including vacuum direct readers.

Work was also nearing completion, he said, on a new series of plain carbon steel standards for direct-reading instruments. This series, which was being standardized for carbon, silicon, sulphur, phosphorus, manganese, and arsenic, would be supplied in the form of 1¼-in. dia. discs for spectrographic work, but Mr. Ridsdale said that they would also be available in the form of turnings for chemical analysis.

"Self-fluxing Sinter"

With reference to the article on "Self-fluxing Sinter," published in our April 15 issue, the author, Dr.-Ing. G. Sironi, wishes to make an amendment under the heading "Sulphur Elimination" on page 853. The words in parentheses beginning in line four should read: "(slag volume 10 cwt./m. ton pig-iron)."



Tapping Iron at Durgapur

TAPPING IRON FROM THE NO. 1 BLAST FURNACE AT DURGAPUR STEELWORKS IN INDIA. THIS FURNACE, ONE OF THREE, WAS BUILT BY HEAD WRIGHTSON & COMPANY, LIMITED, THORNABY-ON-TEES (YORKS), A MEMBER OF ISCON, THE BRITISH CONSORTIUM RESPONSIBLE FOR THE COMPLETE STEELWORKS.

ULTRA HIGH-PRESSURE BLAST FURNACE

New Development in Stack Design

DURING recent years there has developed a growing tendency towards higher top pressures in blast-furnace operation. This has been more pronounced in the United States steel industry than in this country, top pressures up to 9 lb./sq. in. having been applied to one furnace of the Republic Steel Corporation, while pressures of from 3 to 12 lb./sq. in. are in use by the US Steel Corporation.

The Jones & Laughlin Steel Corporation has been operating furnaces up to 7 lb./sq. in., and a new furnace still in the design stage may have a top pressure of 12 lb. Mr. Owen R. Rice, the well-known consultant for the Koppers Company, Inc., Pittsburgh, has recently been advocating pressures several times higher than any at present in use, actually recommending 40 lb./sq. in. in an article published in Steel on March 21. The increased capital cost of such a furnace, he says, will be more than justified by the lower production costs it offers steelmakers.

The Freyn Rating

The ultra high-pressure furnace would require less than $3,000,000 additional capital, but it should yield an extra 700,000 tons of iron a year, it is claimed. In a steel plant requiring 1,400,000 tons of hot metal a year, one might build two, normal pressure, 2,000-ton/day stacks, or one, ultra high-pressure, 4,000-ton furnace.

The cost of the high-pressure furnace would be around $14,760,000, against $22,000,000 for two normal pressure stacks. Capital cost per ton of pig-iron would be $2.49 instead of the $3.61 for two-furnace operation, while operating costs per ton would run about 70 cents a ton less. This would amount to a total saving per ton of iron from the high-pressure furnace of about $1.82. One measure of performance often used is the Freyn rating. At 100 per cent. this indicates coke consumption of 6,300 lb./day per sq. ft. of hearth area and assumes the coke to have fixed carbon content of 86 per cent. The average rating for furnaces in the US is about 97 per cent., but the ultra-high-pressure furnace should operate at 200 per cent.

Theoretically, a top pressure of 30 lb./sq. in. (about 44.7 lb. absolute) should more than double the reduction rate realized at normal top pressure, equivalent to about 50 in. of water, or about 1.8 lb./sq. in. But blast-furnace conditions may demand higher pressure to produce the desired acceleration in reduction, so a top pressure of 40 lb. is recommended. That would permit a furnace driving rate to be doubled; if large enough and charged with the right materials it would turn out 2,000 tons of hot metal daily with normal top pressure, producing twice that amount when operated at 40 lb./sq. in.

The proposed furnace would be built on a 28-ft. hearth, be charged with sinter, preferably self-fluxing, including pieces up to 2 in., and well-screened coke. The furnace filling device, as will be seen from Fig. 1, would be unconventional, the big bell and rotating distributor being eliminated. Two small bells would provide a gas lock, equalizer, and relief valves, ensuring balanced pressures across the bells.

The charge would pass through a 7-ft. throat below the lower bell on to a burden held in place by heavy retaining rings arranged in an echelon, to control the shape and height of the burden.

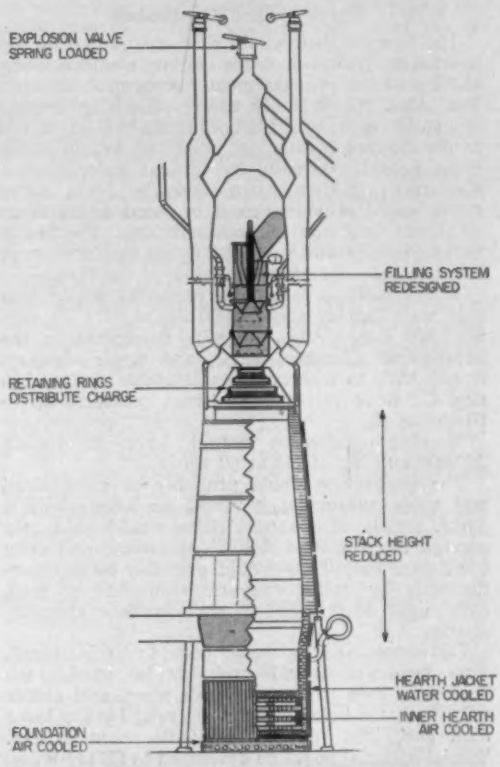


FIG. 1.—PROPOSED MODIFICATIONS TO CHARGING EQUIPMENT OF COOLNG SYSTEM TO ENABLE BLAST-FURNACE OPERATION AT TOP PRESSURES UP TO 40 LB./SQ. IN.

Each skip load would pass immediately through the bells and into the furnace. Skip tubs of 525 cub. ft. capacity, dumping every 2 min., could provide the charge needed to make 4,000 net tons (2,000 lb.) of iron every 24 hrs. at a coke rate of 11½ cwt./ton, allowing 90 min. catch-up time daily. A photoelectric stock gauge, supplemented by a mechanical stock rod, would initiate charging cycles. Hoppers, bells, and throat would be faced with abrasive resistant material, and be preassembled for easy replacement.

Use of beneficiated charge material with increased top pressures would lower top gas temperature and encourage condensation. However, prolonging the passage of gas through the stack 14 per cent. and reducing stack height by a like proportion should increase top gas temperature and check condensation. A height of 72 ft., from tuyeres to stock line, is suggested instead of 82 ft. usually associated with a 28-ft. hearth. The furnace would be equipped with oversize, power-actuated bleeder valves and a spring-loaded explosion valve that would open automatically on failure of the pressure regulation system.

Furnace Shell Continuous

The furnace shell would be continuous from top to bottom, perforations for cooling elements being eliminated, to provide greater structural strength. The usual openings for tuyeres and slag notches would be provided. Carbon lining would extend to the furnace mantle, the shell and hearth jacket being cooled externally by vertical water jackets. Replacing cast-iron hearth staves by 2½-in. rolled plates would provide a mass of metal acting as an additional heat sink in the hearth area. The hearth bottom itself would be cooled by air forced through ducts in the concrete foundation of the furnace.

Stoves built to take high pressures would provide blast heat of about 1,000 deg. C. for 75 min. or 1,100 deg. C. for 60 min. Brickwork in the combustion chamber, dome, and upper checkers would have to withstand temperatures up to 1,250 deg. C., stove valves and fittings, pressures up to 60 lb./sq. in.

Blowing equipment would have to handle 200,000 cub. ft. of air at 60 sq. in.

The stockhouse would probably be mechanized and made automatic; it would no longer hold a 24-hr. supply of material. Bins would hold only enough ore for 6 to 8 hrs.' operation, and coke for 2 to 3 hrs. They would probably be fed continuously by belt conveyors. Conventional scale cars might be replaced by an automatic charging system.

Casthouse capacity would have to be increased. Two tap-holes would probably be used, each having its own trough, skimmer, dam, and cinder fall. Both tap-holes might be served by the same mud gun, iron runner, and ladle spout system. Special material might be developed to fill tap-holes, as these erode more severely at high pressures. The furnace would require a relatively small, wet-type dust catcher, while the gas-cleaning system would apply back pressure at the furnace top, also using the pressure differential between top pressure and gas delivery pressure of about 39 lb./sq. in. for cleaning. The system would be made up of automatically adjustable orifice plates through which water would pass with the gases being cleaned. A sludge recovery system would be provided.

High-speed Photography Aids Blasting Research

PHOTOGRAPHIC equipment, including a high-speed motion-picture camera, being used by US Bureau of Mines' scientists to gain a clearer understanding of what happens when rock is shattered by explosives is described in Report of Investigations No. 5584 ("Use of High-speed Camera in Blasting Studies") published by the Department of the Interior.

By exposing super-sensitive film at speeds up to 3,200 frames per sec., the camera can faithfully record blasting phenomena that occur in fractions of a second, the bureau's report explains. The film, when developed and projected at normal speed, becomes a "slow-motion" picture, enabling viewers to study closely the split-second reactions that took place during blasting.

High-speed photography has provided bureau researchers with valuable information over the past few years, according to the report. For example, it has shown them how rock is moved by the blast, how "stemming" used to confine an explosive charge may either resist, or be dislodged by, the force of an explosion, and how detonation gases escape through broken rock. Such knowledge, the bureau says, helps in identifying poor blasting practices and in developing improved techniques.

The report was written by Byron E. Blair of the bureau's Applied Physics Laboratory. It contains detailed descriptions, including illustrations, of the photographic equipment employed in blasting studies and gives step-by-step instruction on how the equipment is used to assure accurate results.

Uses for Depleted Uranium

POSSIBILITY of using uranium to combat urban air pollution was discussed by US Government scientists during a meeting at Reno, Nev., held to review progress in studies through which the Bureau of Mines hopes to develop industrial applications for depleted uranium which is available in the form of uranium hexafluoride.

This material is called "depleted uranium" because most of the fissionable component, U-235, has been removed in producing enriched atomic fuel. It has potential uses in several fields, the bureau believes.

The proposed use of this mildy radioactive material as a smog inhibitor envisages a depleted-uranium catalyst that could be installed in an automobile-exhaust system to convert gases into harmless substances. Preliminary studies by the bureau indicate the technical feasibility of such an application for uranium.

Other uses on which the bureau has been conducting research would employ derivatives of depleted uranium in high-strength steels, in alloys for bearings, as a heavy medium for separating minerals from their ores, as a catalyst in processing oil from oil shale, and to guard underground pipelines, ship hulls, and other structures from corrosion.

Company News

Davy-Ashmore, Limited

TERMS OF MERGER OF DAVY-UNITED AND POWER-GAS

TERMS of the merger between Davy-United, Limited, and the Power-Gas Corporation, Limited—first announced last November—have now been published. Davy-United is to offer 17 £1 ordinary shares in exchange for every 20 10s. ordinary of Power-Gas. Davy-United—the parent company of the group—is to change its name to Davy-Ashmore, thereby continuing the name associated with the principal operating subsidiary of the Power-Gas group, Ashmore, Benson, Pease & Company, Limited.

Davy-United holders will get 55.9 per cent. of the £5,399,056 equity of the new holding company and Power-Gas holders 44.1 per cent. This division, it is stated, is based primarily on the earning power of the two groups and has been arrived at after detailed consideration of estimates of future profits of both.

The merger is also bringing larger dividends. In the case of Davy-United the dividend for the year to the end of March last is to be 22½ per cent. (against 15 per cent. in 1958-59), while Power-Gas, whose year-end is September 30, will pay a special interim of 17½ per cent. for the six months to the end of March. For 1960-61 a dividend of 25 per cent. is forecast on the shares of the new holding company.

The existing subsidiaries of the two groups will continue to operate under present managements and the name Power-Gas Corporation will be taken by one of its operating subsidiaries. Interests of the employees of the two groups will be fully protected. The boards of both companies will strongly recommend the proposals for acceptance.

GLACIER METAL COMPANY, LIMITED—Dividend for the year ended February 29, 1960, is 13 (11½) per cent. Net profits were £159,795 (£117,164), after tax of £98,699 (£95,300).

PRICE & EDWARDS (ENGINEERING), LIMITED—The issued share capital has been acquired by the Standard Industrial Group, Limited, for £100,000 in cash and 100,000 ordinary Standard 2s. 6d. shares.

RANGE BOILERS, LIMITED—Final dividend of 27½ per cent. for 1959 makes 35 (30) per cent. A one-for-one scrip issue is proposed. Group net profits rose from £121,544 to £153,513, after tax of £135,555 (£111,900).

HAWKER SIDDELEY GROUP, LIMITED—Following an increase in the original holding of 47 per cent. to 100 per cent., Switchgear & Engineering Corporation of South Africa (Pty.), Limited, is now a wholly-owned subsidiary.

LANCASHIRE STEEL CORPORATION, LIMITED—Interim dividend is raised by the equivalent of 1 per cent. to 3½ per cent. in respect of the year ending October 1, 1960. The 1958-59 total was equal to 8½ per cent. on the present capital as doubled by a scrip issue.

THOMAS LOCKER (HOLDINGS), LIMITED, woven wire and wirecloth manufacturers, etc., of Warrington (Lancs)—Final dividend of 9½ per cent. makes 17 (15) per cent. for the year to March 31, 1960. Group net profits were £187,890 (£186,349), after tax of £190,962 (£178,152).

ROTARY HOES, LIMITED—Final dividend of 7½ per cent. on capital increased by a one-for-one scrip issue and a subsequent one-for-nine rights issue, makes 12½ per cent. (5 per cent. equivalent) for 1959. Group net profits rose to £210,127 from £169,865, after tax of £217,774 (£127,292).

GERRARD INDUSTRIES, LIMITED, manufacturers of tensional steel strapping, equipment, machines, etc., of Brentford (Middx)—Group net profit increased from £61,241 to £86,889 in the year to March 31, 1960, and the dividend is stepped up by 2½ per cent. to 15 per cent. with a final of 10 per cent.

LAPORTE INDUSTRIES, LIMITED—Final dividend of 7½ per cent. as forecast on capital increased by a one-for-five scrip issue, makes a total equivalent to 10 per cent. on the increased capital for the year to March 31, 1960. Group net profit rose to £1,808,096 (£1,003,738), after tax of £1,339,847 (£809,640).

COALITE CHEMICAL PRODUCTS, LIMITED—Final dividend of 11½ per cent. makes 16½ (13) per cent. for the year ended March 31, 1960. Group net profit increased from £380,335 to £500,977, after tax of £412,916 (£357,404). It is proposed to capitalize £964,375 of reserves in a one-for-two scrip issue.

W. & T. AVERY, LIMITED, manufacturers of weighing, counting and testing machines, of Birmingham—The final dividend of 10 (same) per cent. for the year to March 31, 1960, and a 5 per cent. bonus makes 20 (15) per cent. Group net profit rose from £1,147,598 to £1,472,033, after tax of £1,157,611 (£999,721).

HARGREAVES (LEEDS), LIMITED, coal merchants and shippers, etc.—Group net profit rose from £238,196 to £281,483, after tax of £207,426 (£206,882), in the year ended March 31, 1960. The unchanged final dividend of 10 per cent. maintains 15 per cent. for the year. A one-for-two rights issue is proposed for the near future.

GIBBONS (DUDLEY), LIMITED, manufacturers of refractories and coal carbonizing plants, of Dudley, (Worcs)—Final dividend of 12 per cent. maintains 16½ per cent. for 1959, in addition to which a 4 per cent. capital distribution is to be paid. Net profit was £157,728 (£153,272), after tax of £157,625 (£150,475).

W. WILLIAMS & SONS (HOLDINGS), LIMITED, makers of sand-gravity-pressure castings—The chairman, Mr. H. H. Williams, states that work in the bronze foundry has improved and it is hoped to erect a new foundry in Cardiff soon to cope with increasing demands for quality castings. Additional foundry bays are being

built at Pontyclun and a well-equipped machine shop opened during the year at the Colchester factory estate. Net profit for the year ended December 27, 1959, was £47,431 (£50,157). A final dividend of 8 per cent. is recommended. No final was declared for 1958, but a special interim of 7 per cent. was paid.

DERITEND STAMPING COMPANY, LIMITED, dropforgers, etc., of Birmingham—The 11¼ per cent. final on capital increased by a one-for-two scrip issue makes the equivalent of 17 per cent. for the year to February 29, 1960. The previous equivalent was 13¼ per cent. Group profits rose to £712,226 (£549,994) and the net balance to £291,421 (£229,648).

CANNON (HOLDINGS), LIMITED, manufacturers of cast-iron enamelled chemical plant, domestic gas appliances, etc., of Bilston (Staffs)—The directors regret that trading results for the first six months of the financial year do not justify the payment of an interim on the ordinary shares. The previous year's interim was 5 per cent. and the final 15 per cent.

CHARLES WICKSTEED & COMPANY, LIMITED, engineers and machine-tool makers, of Kettering (Northants)—The company has been acquired by Dorada Holdings, Limited, for an approximate consideration of £370,000 cash and the issue of 38,500 6½ per cent. redeemable £1 preference and 38,500 ordinary 5s. shares. The business will continue to operate as a separate unit.

TIPPER INDUSTRIES, LIMITED, malleable and grey iron founders, etc., of Birmingham—Dividend of 25 per cent. for 1959 is maintained with a final of 17½ per cent. It is proposed to capitalize £150,000 of reserves in a one-for-one scrip issue, and to increase the capital to £400,000 by the creation of 1,000,000 shares of 5s. Group net profit increased from £44,718 to £57,574.

SANDERSON BROS. & NEWBOULD, LIMITED—The offer to acquire the capital of Kayser Ellison & Company, Limited, makers of high class electrical steels, etc., of Sheffield, has been declared unconditional. Acceptances have been received in excess of 90 per cent. of both preference and ordinary shares. Board of Trade permission has been given to the change of name to Sanderson Kayser, Limited.

RUGBY PORTLAND CEMENT COMPANY, LIMITED—The group's deliveries of cement and net profits for the current year to date were in excess of those for the same period of 1959, said Sir Halford Reddish, chairman. Demand was particularly strong in the home market, and already this year the company had broken its previous records for tonnage of cement delivered in any one day, week, or month.

S. RUSSELL & SONS, LIMITED, ironfounders, mechanical and structural engineers, of Leicester—Final dividend is 10 per cent. against a forecast of not less than 7½ per cent. at the time of the one-for-one scrip issue in February. The total equivalent for the year ended March 31, 1960, is 12½ per cent. compared with 8¾ per cent. previously. Net profit rose from £62,122 to £86,192, after tax of £71,897 (£43,778).

WORTHINGTON-SIMPSON, LIMITED, hydraulic and general engineers, of Newark (Notts)—During 1959 more of the standard ranges of equipment were produced and sold than ever before and with the trend continuing so far this year, the order-book remains at its usual high level, states the chairman, Sir Samuel Beale. Profit for 1959, before tax, was £886,051 (£1,058,759) and the dividend is raised to 20 (17½) per cent.

BROOKE TOOL MANUFACTURING COMPANY, LIMITED—Results for the first half of the year indicate that the group is again trading on a profit basis and the dividend is resumed with a 5 per cent. interim for the year ending in September. The interim was influenced by the fact that no distribution was made in respect of the previous year and should not be taken as an indication of the total distribution for this year. A total of 6 per cent. was paid in 1957-58.

MINERALS SEPARATION, LIMITED, London, E.C.4—Final dividend of 8d. is to be paid, making 1s. per 5s. stock unit for 1959, on capital increased to £2,000,000 by three-for-22 rights and subsequent three-for-five scrip issues, compared with a previous equivalent total, adjusting for the capitalization, of 11¼d. It is proposed to raise £1,000,000 of new capital by a one-for-four rights issue of 2,000,000 5s. shares at 10s. a share. Group net profits expanded from £312,865 to £469,446.

STONE-PLATT INDUSTRIES, LIMITED—Despite increased turnover in the last quarter of 1959, the total output was some 11 per cent. lower than in 1958 but, the chairman, Sir Kenneth Preston, states, the future prospects are more encouraging. At the end of last year the group order-book was 20 per cent. up on 1958 and turnover for the first quarter of the current year was 15 per cent. more than the corresponding period of 1959. Orders for the first three months of the year were 20 per cent. greater than the three-monthly average for the previous 12 months.

Iron-ore Imports

IMPORTS of iron ore and concentrates (except chrome iron ore and roasted iron pyrites) in April, and the totals for the first four months of this year and last, are shown in the table below.

From	Month ended April 30.	Four months ended April 30.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Sierra Leone	83,560	202,245	282,310
Canada	14,286	116,260	237,044
Other Commonwealth countries and Eire	5,741	4,590	12,063
Sweden	303,144	840,140	1,485,291
Norway	30,329	100,904	107,518
France	49,707	158,191	208,226
Portugal	51,452	65,933	125,557
Spain	54,240	172,904	270,097
Algeria	169,049	574,347	763,809
French West Africa	—	102,929	—
Tunisia	117,370	223,871	315,731
Morocco (excluding Tangier)	82,310	142,849	270,737
Liberia	23,750	130,273	176,320
Venezuela	132,961	479,003	560,491
Brazil	96,106	173,517	247,289
Other foreign countries	90,032	47,258	273,262
TOTAL	1,304,037	3,535,214	5,335,745

NEW REDFYRE CENTRAMATIC FACTORY

NEW factory for the manufacture of Redfyre Centramatic 50 and 80 oil-fired boilers has been built by Newton, Chambers & Company, Limited, Thorncliffe, near Sheffield. It has been designed to meet the big production programme necessitated by the high demand for these boilers experienced since they were introduced last year. Redfyre Centramatics are fully automatic oil-fired boilers of 50,000 and 80,000 BTU/hr. outputs for central heating.

The new factory has already more than trebled the production capacity for Redfyre Centramatics, and avoided any extension of the delivery period arising from exceptional demands.

THE COAL TRADE

A MUCH greater response to the appeal for summer stocking is required if the domestic trade is to heave itself out of the doldrums of fine weather and the approaching holiday period. There is a very good choice of fuels, supplies are plentiful, and delivery expeditious. Even anthracite nuts are more easy to come by and if householders are not ordering now, merchants are making sure of as much as possible to meet the sudden demand which is bound to come later in the year.

SCOTLAND

Glasgow—House coal merchants are taking up supplies satisfactorily despite the milder weather. Stocks at depots have recovered in the past week or so and now stand at 55,000 tons against 52,000 tons in 1959. Anthracite stove nuts are clearing immediately against orders outstanding from several months ago, and merchants are able to supply consumers satisfactorily. Anthracite large is surplus to current requirements and a stock is being put down at pithead, but duff meets a brisk demand for shipment abroad. Manufactured fuels are a slow trade, and briquettes, hard coke nuts, and gas coke sell with difficulty.

In the industrial range the pressure has eased-off following the seasonal slump in space-heating. Coking smalls are a strong feature, with throughput at the ovens nearly double that of a year ago.

Total undistributed stock amounts to 1,060,000 tons in contrast with 550,000 tons last year, but the rate of augmentation is much slower, 8,000 tons being added in a recent week against 37,000 tons a year ago. Pearls present most difficulty, and sizeable quantities are going on the ground, but other sorts are moving away more comfortably.

A strong demand for metallurgical coke is being met satisfactorily from ovens at the various ironworks, and foundry coke, which is a quieter trade, is largely met from NCB plant.

Fife and Lothians—The volume of business is easing with the advance of summer weather, and with outputs being steadily maintained in both zones a small surplus remains unsold at the pits. Export shipments have fallen below last year's level.

Pressed Steel Puts Employees Wise

FOLLOWING its declared policy of making use of the most modern and effective means of communication between itself and its employees the Pressed Steel Company, Limited, has issued two special publications to explain in detail the facts and implications of its big expansion plans at Swindon, Paisley, Swansea, Jarrow, and at Cowley, the company's headquarters.

All management, staff, and supervisors first received a confidential bulletin entitled Management Notes which outlines the main details of the development plans and also discusses the background to other company activities of interest. It may become the first of a series of such bulletins.

Every one of the company's 22,000 employees is to receive a copy of a newspaper-style publication—Press Express—which gives front page prominence to the development scheme.

FINAL ATTENDANCE FIGURES at the Instruments, Electronics and Automation Exhibition which closed at Olympia on Saturday were 75,276. Of these, oversea visitors totalled 4,015 from 61 different countries.

Moves to Counter French Coal Crisis

COMPETITION from the Lacq natural gas field, coupled with two mild winters in succession, have led to a critical situation in the French mining industry. Pithead stocks between last autumn and May 1 this year rose from 8,700,000 tons to 10,000,000 tons, and some 1,000,000 tons were lost by part-time working.

Various "authoritarian" measures to deal with the situation, such as restricting imports from the other ECSC countries, or imposition of a tax on fuel oil have been rejected by the Minister responsible, M. Jeanneney, as being "un-European" or out of keeping with the Government's liberal trade policy.

Instead, he is to consult with unions on "rearranging" working hours in the mines, raising compensation for part-time working to the level of the basic full-time wage, the provision of indemnities to allow older miners in the worst-hit regions to retire, and the offering of special concessions to new industries in the mining area.

The ECSC High Authority met the Belgian Minister of Trade yesterday (Thursday) for talks on Belgium's second coal industry reorganization programme, and the proposed closure of a further 4,000,000-metric-tons production capacity in the Belgian mines by 1963. A Bill is to be laid before Parliament to reorganize the country's coal administration, replacing the present National Coal Council with a National Mining Committee. As well as producers, workers, and Government departments, the new committee will represent consumers and energy experts, and have as members two Government-appointed "Commissars." It will have power to fix conditions of sale or price lists, work out general production targets, fix production costs, determine subsidy needs, and supervise closure schemes.

The Authority is to discuss with the French Government problems relating to the country's coal import syndicate ATIC. The court case in which a Belgian coal importer has complained that ATIC has forbidden him to sell American coal to a French customer has been postponed. Point of the case is to determine whether ATIC's action is in key with the free trade measures of the ECSC charter.

Steinkohlen Bergwerke Mathias Stinnes A.G. is reducing its dividend from 10 per cent. to 8 per cent. on its ordinary shares, and from 11 to 9 per cent. on preference shares for 1959. Reason for the reduced distribution is the coal crisis, with the consequent need to rationalize production.

THE loan of NF. 350,000,000 issued by the French coal industry was fully subscribed within four days.

Coalfield News

MINER who retired last month after 54 years in the industry, Ald. William Gill, has been elected Mayor of Barnsley.

EXPORTS of coal, coke, and patent fuel through the port of Goole for the four weeks ended May 22 dropped to 123,566 tons, compared with 152,916 tons in the corresponding period last year.

MONMOUTHSHIRE MINER, Mr. William Marcus, who rescued an eight-year-old boy who fell into the River Sirhowy in January, has been awarded the Royal Humane Society's Testimonial on Vellum.

Mr. JIM KITCHIN, who was employed at Wombwell Main Colliery for 40 years, and was treasurer of the NUM branch for many years, received presentations last Friday on the eve of his departure for Canada.

MAIN DRAWING SHAFT at Chopwell Colliery (Co. Durham) is to be closed, and coal will be brought to the surface by way of a new drift now being completed. The railway connecting Chopwell with Derwenthaugh coke works is to be closed.

SEATON DELAVEL COLLIERY (Northumberland) was closed last week and 260 miners became redundant. Some men are being retained on salvage work, and about 50 were offered work at Choppington and Netherton pits, but only 18 accepted. The others refused because the NCB was unable to provide transport facilities.

FOUR MEMBERS of the Manvers Main Colliery branch of the NUM have been appointed to leading civic positions. Mr. J. Randerson, branch secretary, is chairman of Swinton Council, Mr. T. Roebuck, branch delegate, is chairman of Mexborough Urban Council, and Mr. J. Wootton (Mexborough) and Mr. G. Reader (Swinton) are vice-chairmen.

GUIDE DOG for a former miner, Mr. F. Mellors, who was blinded in a pit accident four years ago, has been paid for largely by contributions from the National Union of Mineworkers and the Coal Industry Social Welfare Organization. The National Coal Board is erecting a fence round Mr. Mellors' garden and building a kennel for his dog.

ONE OF THE LARGEST presentations made in a British coalfield is planned by Michael Colliery, East Wemyss (Fife). Nearly 120 miners who have reached retiring age will be entertained at dinner and each presented with a watch and certificate of long service. The cost will be defrayed from a voluntary levy at the pit, which is expected to realize over £250.

DISMISSAL NOTICES for 71 redundant miners at Ireland Colliery (Derbyshire) are to be held over until after the men's holiday. Mr. Bert Wynn, secretary of the Derbyshire Area of the NUM, pressed for the notices to be held over because the men would not enjoy their holiday if they knew they would have to leave soon after they returned.

MEMBERS OF PARLIAMENT for the County of Durham are to visit Durham Divisional Coal Board on June 17. After meeting the members of the board, one party will visit the recently completed Hawthorn Combined Mine and the adjoining Murton coke ovens in the No. 2 Area, while the second party will visit Fishburn Colliery and coke ovens in No. 4 Area.

DELEGATION of 14 British MPs in Belgium at the invitation of the European Coal and Steel Community visited Mons on Tuesday and discussed the crisis in the Borinage coal basin, where the situation is likened to that in Co. Durham and Wales. The visitors heard of the difficulties of creating new employment, and visited one of the pits and a re-adaptation centre.

TENTH ANNUAL golf competition for the Chairman's Cup will be staged by No. 6 Area (Durham Division) Golfing Society on Saturday, July 2, over the South Moor golf course. The cup, presented by Mr. E. H. D. Skinner, former chairman of the Durham Divisional Board, may be held only by a golfer employed in the Division, but any NCB employee may qualify for other prizes.

FIRE broke out in an abandoned working at Bagworth Colliery (Leics) on Monday night. Mine rescue teams were rushed to the colliery and the fire was walled up behind a 15-ft. thick barrier of sandbags in the hope that it could be stifled. An underground roadway joining Bagworth to the adjoining Nailstone Colliery was blocked during the operation and may never be restored.

PRAISE for the first-aid organization at Sherwood Colliery (Notts) was given by the Nottingham district coroner, Mr. C. A. Mack, at a Mansfield inquest on Monday on Mr. Wilfred Coupe (39), a miner, who was trapped by falling coal and died later in hospital. Tribute to the safety record of the pit was paid by Mr. W. Baker, a NUM official. A verdict of Accidental Death was returned.

ASSURANCE HAS BEEN GIVEN by the National Coal Board to the Stirlingshire County Council that no decision has been taken on the question of abandoning the new pit operations at Airth. The NCB has assessed the demand for coking coal and decided that production of coal from the Airth pit could be deferred for a number of years. No decision had been taken to abandon the scheme.

CLOSING OF THE Parkgate seam at Aldwarke Main Colliery, near Rotherham, soon, will make 90 men redundant, but work for them is expected to be found at other local collieries such as New Stubbin and Manvers Main. Members of Aldwarke branch of the National Union of Mineworkers were told the seam was uneconomic and shortage of day-wage workers had been causing difficulty.

PARTY of Russian mining engineers who are in Britain to exchange information on ground subsidence attended a conference at Doncaster recently. Representing the North-Eastern Divisional Coal Board were Mr. C. Beevers, chief surveyor, Mr. Eric Levett, assistant surveyor, Mr. R. White, housing manager, Mr. R. Orchard, subsidence engineer of the NCB, and the NCB interpreter, Mr. J. Grantham.

FOLLOWING complaints by residents in the area of Wollaton Colliery (Notts) about the noise from the ventilation fan, Mr. Peter Tapsell, MP for West Nottingham, toured the area on Saturday. Mr. Tapsell, who was accompanied by NCB officials, found that the noise was not sufficient to warrant his pressing the board to buy a new £40,000 fan. The board is to fit a gadget to the fan to lessen the noise.

CONSETT IRON TRADING SURPLUS OF £4,039,224

FINAL dividend of 5¼ per cent. to be paid by the Consett Iron Company, Limited, makes 8¼ per cent. for the 53 weeks to April 2, 1960. A total of 4 per cent. was paid for the previous period of 26 weeks, against 8¼ per cent. for the year ended September 27, 1958.

The surplus of trading income over expenditure for 1959-60 was £4,039,224, against £1,359,413 for the six months. Depreciation takes £1,489,211 (£736,234) and the balance, before tax, is £1,997,158 (£529,761) after debenture and loan interest of £420,256 (£44,317).

Coal is Again in the Fashion

COAL was once again fashionable, said Mr. Noel Gee, staff director of the East Midlands Divisional Coal Board, guest speaker at the Coal Industry Society's luncheon in London on Tuesday. Mr. Gee, until recently public relations officer of the National Coal Board, was reviewing the promotion work undertaken by the industry as he sees it now that he is out of close contact with public relations.

He was delighted to see that the industrial coal campaign was in full swing. "Manufacturers," he said, "are becoming increasingly anxious to join with the board in advertising those wares which tie up with coal. A pretty heartening effort is also being made by coal merchants." If some also advertised alternative fuels, he added, it did not matter—the goodwill of the customer was the most important factor.

Mr. Gee also warned his audience not to underestimate the work done by the unions. They were doing all they could to push their own fuel, he said. It was also heartening to see that the oil industry had been obliged to step up its own publicity.

The title of Mr. Gee's address was "Coal is on the March." "If coal is on the march," he commented, "the tune is no longer that of Colonel Bogey."

Viscount Hyndley, chairman of the NCB from 1946 to 1951, was re-elected president of the society and the new chairman is Mr. D. L. Dobson.

WILMOT BREEDEN EXPANDS IN FRANCE

SALES of £4,000,000 are forecast for the French subsidiary of Wilmot Breeden (Holdings), Limited, manufacturers of automobile accessories, etc., of Birmingham. The company acquired 61 per cent. of the ordinary share capital of Autocoussin-Dura, SA, in September, 1959, for £312,000. Mr. D. L. Breeden, chairman and joint managing director of the parent company, has announced that "a very large programme of expansion and reorganization is now taking place."

Since September the French company has bought a third factory of about 100,000 sq. ft., together with land for expansion at St. Die, near Strasbourg. Two French companies are to be formed—Autocoussin for the manufacture of car seats, and Compagnie Industrielle de Mecanismes to make mechanisms—and these will take over the assets of the existing Autocoussin-Dura company.

GEC AND BRITISH-GECO VENTURE

COMBINATION of the resources and knowledge of the General Electric Company, Limited, and the British-Geco Engineering Company, Limited, Edenbridge, on matters related to induction heating has been achieved under an agreement between the two companies. Under the agreement the design, manufacture and sale of induction furnaces will be carried out jointly.

Their extensive facilities for research and development can now be applied to the design and manufacture of melting and billet heating equipments, soldering and brazing machines, local heat treatment plant and stress-relieving equipment.

More Coal Taken into Stock

RISE of over 200,000 tons in distributed coal stocks in the week ended May 21 indicates that there is some fairly widespread re-stocking going on. The steady output at just over 4,000,000 tons a week with consumption down to 3,637,000 tons is producing the surplus that goes to swell undistributed stocks. These have almost reached 33,500,000 tons.

There were 607,000 wage-earners on colliery books on May 21, against 666,600 on May 23, 1959, the numbers engaged at the coal face being 231,900 and 259,000 respectively. Total absenteeism (all workers) in the week ended May 21 was 14.58 per cent. compared with 15.39 per cent. in the week ended May 23, 1959. Output at the face was 3.972 tons and overall 1.409 in the week ended May 21, compared with 3.591 and 1.252 tons in the week ended May 23.

The following table gives (in tons) the output of saleable mined coal by division in the week ended May 28, and the tonnage lost through all causes (holidays, disputes, and go-slows):—

Division.	Week ended May 28, 1960.		Week ended May 30, 1959.
	Total output.	Tonnage lost.	Total output.
Scottish	366,400	4,000	388,600
Northern (N & C) ..	250,100	—	273,200
Durham	461,600	—	488,600
North-Eastern ..	824,400	48,300	859,300
North-Western ..	286,800	400	294,400
East Midlands ..	905,300	—	941,500
West Midlands ..	292,900	800	318,700
South-Western ..	406,400	2,900	433,100
South-Eastern ..	32,200	—	32,700
Great Britain—			
Deep-mined coal ..	3,806,100	56,400	4,030,100
Other deep-mined (including licensed mines) ..	43,500	—	56,500
Open-cast coal ..	161,000	—	242,700
TOTAL	4,010,600	56,400	4,329,300

Obituary

The death has occurred of Mr. JOHN TOOTLE at the age of 71. He was an undermanager with the Wigan Coal Corporation, Limited, and later with the National Coal Board, until his retirement five years ago.

The death took place on May 20 of Mr. Robert Anderson Moncur who for 46 years was associated with the mining industry. He was apprenticed at Wearmouth Colliery (Co. Durham) and took a B.Sc. degree at Durham University. During the war he was agent at Haunchwood Colliery (Warwickshire) and then for three years served as production controller with the North German Coal Control. From 1948 until his death he was manager at Silverhill Colliery in No. 4 Area of the East Midlands Division of the NCB. He was corps superintendent of the St. John Ambulance Brigade and a Serving Brother of the Order of St. John.

HEARING of the inquiry by an inspector of the Ministry of Housing and Local Government into the proposal for ironstone working in north Oxfordshire has been fixed for June 25.

Appointments

Mr. J. L. Orme for New GEC Post

AFTER the recent appointment of Mr. E. W. Molesworth as chief engineer for the London, Eastern, and Southern regions, the engineering group of the General Electric Company, Limited, has now announced that Mr. J. L. ORME is to be deputy chief engineer of these areas. Educated at Trent College, Mr. Orme was apprenticed to GEC in 1920 and was nominated by the company for a scholarship at Birmingham University. He returned to the Witton Works and later spent three years as assistant branch engineer at Cardiff.

In 1928 he transferred to the head office and was later made chief assistant to the manager of the central stations department. In his new post Mr. Orme will be associated with all the engineering activities of the company while still retaining the supply industry as his main interest.

Mr. F. G. BLOCK has been appointed secretary of Brown Bros., Limited, in place of Mr. T. C. Coppin who retains his seat on the board.

Mr. R. W. THORNTON, previously sales engineer of the company's industrial units division, has been appointed sales manager of Leyland Motors, Limited.

Following the death of Mr. W. M. Grainger, Mr. A. S. BEAUMONT has been appointed secretary to Walter Somers, Limited, and Walter Somers (Materials Handling), Limited.

Mr. JOSEPH MAUGHAN, manager of Havannah Drift Colliery, Wideopen (Northumberland), has been appointed agent-manager of the Rising Sun Colliery (Northumberland).

Mr. J. A. BOLT is to succeed Mr. A. M. Wood who is retiring after 50 years' service as manager of the oil burning department of the Wallsend Slipway & Engineering Company, Limited.

Dr. G. S. ATKINSON has been appointed principal of Rugby College of Engineering Technology and is resigning his appointment as principal of Constantine Technical College, Middlesbrough.

Mr. DAVID I. HERBERT has been appointed publicity manager of George Ellison, Limited, engineers and manufacturers of electrical switchgear, of Birmingham. He succeeds Mr. S. H. Bailey who is retiring after holding the position since 1934.

Mr. GEOFFREY ALBERT CHURCH has been appointed principal of Lincoln Technical College, in succession to Dr. E. R. Walter, who is retiring at the end of the year. Mr. Church is at present head of the engineering department at Dudley and Staffordshire Technical College.

Mr. H. J. BALL, a former works manager in the group, has been appointed general manager of Sheepbridge Equipment, Limited, a member of the Sheepbridge Engineering, Limited, group of companies. Mr. E. G. SCRANNAGE has been appointed works manager and Mr. A. ELLIOTT chief buyer of the group. Mr. J. H. Lomas has left the group.

Mr. A. M. PORKESS has been appointed chief engineer of the National Gas & Oil Engine Company, Limited, a member of the Hawker Siddeley Group, Limited. Previously chief design and development engineer on medium speed engines for Ruston & Hornsby, Limited, Mr. Porkess, who is 38, served his apprenticeship with G. & J. Weir, Limited, Glasgow.

Mr. W. SWANSON, manager at Isabella Colliery, Mid-Northumberland Area of the Northern (N&C) Divisional Coal Board, for 10 years, has been appointed manager of Crofton Mill Pit, Blyth (Northumberland). He succeeds Mr. J. S. Barras, who has retired after 50 years in the coal industry. New manager at Isabella Colliery will be Mr. R. W. ROWELL, manager of Seghill Colliery.

Mr. H. R. HERBERT, who went to Nuneaton in 1940 as surveyor and planning engineer with Haunchwood Collieries, Limited, and who has latterly been chief surveyor and mineral estates manager at Nuneaton of the Warwickshire Area of the West Midlands Divisional Coal Board, has been appointed chief surveyor and minerals manager of the East Midlands Division. He takes up his new post in August.

GKN's £20,000,000 Development Plans

OVER the next four or five years a £20,000,000 steelworks development plan is to be undertaken by the Guest, Keen & Nettlefolds, Limited, group. A month ago it was announced that Guest, Keen Iron & Steel Company, Limited is to spend £6,750,000 to raise iron and steel production.

In his annual review, the chairman of the group, Mr. K. S. Peacock, states that to take care of the likely future demands by the group's engineering companies on its steelworks and to replace certain outside supplies, expansion of output at the steelworks is required on a long-term basis. The board had approved the proposals in principle and although expenditure would be spread over the next five years, it was expected that the heaviest amounts would fall in the years 1960, 1961, and 1962. Out of the total cost of the schemes only £2,225,000 was included in the total figure of £18,600,000 expenditure outstanding at January 2, 1960. During the year substantial spending is likely to be sanctioned for development at engineering works, much of it in relation to motor industry expansion and during the next three years capital expenditure is unlikely to fall below an annual rate of £18,000,000.

There is no indication by Mr. Peacock that GKN will need to raise new money and immediate prospects suggest that earnings should cover capital expenditure. Trading conditions are good, the outlook is promising, and almost all sections of the group are heavily occupied with substantial order-books.

Making a reference to renationalization, Mr. Peacock said that following the result of the General election and the untold relief that accompanied it, it was to be hoped that out of the present thinking of the Labour Party on the subject of nationalization would come the realization in good time that very few doctrinaire policies operate satisfactorily in practice.

Japanese Steel Bids Fair to Break Record

FERROUS metals output in Japan so far this year indicates that the final 1960 figures will surpass last year's record figures. Hypothetical 1960 totals, in metric tons and gauged from current output, with last year's actual totals in brackets are:—Pig-iron 10,800,000 (9,450,000), raw steel, 19,800,000 (16,630,000), and rolled products, 15,110,000 (12,920,000).

Exports realized a record $290,000,000 last year, although the total volume of steel exported was 500,000 tons below the record of 2,310,000 tons in 1955.

Balfour Group Launches New Research Centre

NEW £250,000 research and development centre of the Henry Balfour group of companies was opened at Leven, Fife, last week by Mr. John S. Maclay, Secretary of State for Scotland. The centre's functions will include the carrying out of development work to improve the design and operation of chemical engineering plant and the provision of pilot plant facilities.

The centre, which has been described as "an engineer's paradise," will also act as control laboratory—particularly in the metallurgical and ceramic fields—to carry out physical and chemical tests on samples. It will demonstrate applications of plant and processes on clients' raw materials, and test and evaluate plant before despatch to them.

Parent company of the group is Henry Balfour & Company, Limited, with the two Scott companies, George Scott & Son (London), Limited, and Ernest Scott & Company, Limited, as the main design chemical engineering divisions. The associate company of Enamelled Metal Products Corporation (1933), Limited, provides corrosion resistant plant with special reference to glassed steel.

Opening of the research centre this year marks an important date in the history of the group. Not only is 1960 the 150th anniversary of the founding of Henry Balfour & Company, but it also marks the completion of 125 years of trading of George Scott & Son (London), the 68th year of operation of Ernest Scott & Company, and the start of the second quarter century of operation of Enamelled Metal Products.

Fork Lifts in Heavy Steel Industry

PIONEERED by Dorman, Long & Company, Limited, at its Lackenby steelworks, the now familiar principle of the fork lift for handling moderately heavy factory products has been extended by the company to the heavy steel sector. Dorman, Long has introduced heavy duty side operating fork lift transporters at Lackenby where four are already in operation.

Two more are to be specially insulated so that when required they can handle hot blooms from the blooming mill up to a maximum temperature of 700 deg. C. and stack them in this condition. The fork lifts, which are able to handle loads of 15 tons are made by Materials Handling Equipment (Great Britain), Limited, London, W.1.

Fell From Overhead Crane Gantry

WHEN a Nottingham inquest jury on Wednesday recommended that guard rails should be provided or safety belts issued to men working on overhead cranes at the Stanton Ironworks Company, Limited, Mr. G. W. Hodgson, for the company, said safety belts were available to the fitters if they wished to wear them. A verdict of Accidental Death was returned on Mr. Clifford Boultbee (55), a fitter's mate, who died after falling from an overhead crane gantry at the works.

The coroner, Mr. A. C. G. Rothera, said the fitter and his mate were engaged on a very special type of work and it might be there was no recognized method of doing it other than the one used.

Board Changes

To Manage Head Wrightson Subsidiaries

FUNDAMENTAL changes in directorships of the HEAD, WRIGHTSON & COMPANY, LIMITED, group of engineers, iron and steel founders, etc., of Thornaby-on-Tees (Yorks) are announced. Mr. J. G. Allen is to take over the managing directorship of Head, Wrightson Steel Foundries, Limited, while Mr. G. Jones is to become managing director of Head, Wrightson Stampings, Limited.

The Middlesbrough subsidiary, Head, Wrightson Machine Company, Limited, is to come under the managing directorship of Mr. W. H. Mather with Mr. G. Gowthorp as commercial director. Mr. T. H. Stayman has been appointed the new managing director of Head Wrightson Iron & Steel Works Engineering, Limited.

With the exception of Mr. Gowthorp, who was previously assistant general manager of Head Wrightson Machine, all the new appointees were previously directors of their respective companies. Sir John Wrightson retains the chairmanship of the group.

POWELL DUFFRYN TECHNICAL SERVICES, LIMITED—Mr. J. W. Law, secretary of the company, has been appointed a director.

PRINCE-SMITH & STELLS, LIMITED—Mr. F. Walters has been appointed finance director. He joined the company five years ago as chief accountant.

BABCOCK & WILCOX, LIMITED—Mr. W. Lionel Fraser, who retired as chairman on Thursday of last week, has been appointed the first president of the company. Sir Kenneth Hague becomes chairman with Sir Reginald Verdon Smith deputy chairman. Mr. Fraser was chairman for 10 years.

DOWTY GROUP, LIMITED—Mr. F. Bastow has been appointed managing director of Dowty Seals, Limited. Mr. C. F. Porter and Mr. K. G. Ward have joined the board of Dowty Mining Equipment, Limited, and Mr. C. N. King has been made a director of Dowty Hydraulic Units, Limited.

POWER-GAS CORPORATION LIMITED—Mr. L. H. Downs, chairman and managing director of Rose, Downs & Thompson, Limited, and a director of a number of other companies, has been appointed vice-chairman of the group. Mr. C. Robson has resigned from the boards of P.G. Engineering, Limited, and Ashmore, Benson Pease & Company, Limited, to become managing director of Rose, Downs & Thompson. He will continue as a director of the Power-Gas Corporation.

Fine Temperature Control at Colvilles

ELECTRIC furnace temperature control to within a half of a degree Centigrade, or closer, has been achieved at a new steel testing installation at the research department of Colvilles, Limited, at Mossend, near Glasgow. The first of six electric resistance furnaces fitted with the control is now working.

The furnaces have been installed to collect creep/rupture data on the various steels which the company produces. The temperature of specimens and furnace zones can be kept within very close limits by the control, which is made by Honeywell Controls, Limited, Greenford (Middx).

NEWS IN BRIEF

NET PROFIT of the Nigerian Coal Corporation, Limited, for the financial year 1958-59 was £155,072. Average cost of a ton of coal in the year's production was nearly £2 8s. 9d., including royalties to the Federal Government.

MANUFACTURING activities in Scotland of Albion Motors, Limited, a subsidiary of Leyland Motors, Limited, are to be expanded. To meet increasing demand, a new site adjoining the Strathleven Industrial Estate has been acquired.

DELEGATES from the Coal Committee of the United Nations Economic Commission for Europe, who are to visit Britain in September at the invitation of the National Coal Board, will inspect mines and other works in the Porthcawl and Port Talbot areas.

EXTENSION of nationalization to include shipping, shipbuilding, and engineering was voted for by the Boilermakers' Society at its annual conference last week. Only four votes were cast against the resolution, which was supported by the executive council.

PORT, HARBOUR INSTALLATIONS, and a bauxite industry are to be created by the Aluminum Company of America in Jamaica's Clarendon Parish, at a cost of £5,360,000. The company has mining rights covering 30,000 acres, and construction is expected to start at the end of the year.

ITALIAN STEEL producers Acciaierie e Fonderie di Modena have laid before the Authority of the European Coal and Steel Community new steel price lists. The new prices are from 2.4 to 3.3 per cent. lower for all the company's products except steel profile, prices for which are down by 5.4 per cent.

TWO NEW foundries are to be built in Ayr. The first will be built by the Wallacetown Engineering Company, Limited, at a cost of £10,000, and will incorporate switchgear fabrication shops. James Dickie & Company (Drop Forgings), Limited, is to spend £9,400 on the construction of its new plant.

THE £100,000 laboratory of the department of metallurgy, which is the first building in the new Oxford University science area planned for the Keble Road triangle, was opened by Mr. Isaac Wolfson on Tuesday. Mr. Wolfson has given an endowment of £65,000 for the establishment of the chair of metallurgy.

TO SATISFY the growing demand for technical people in steel works, refractories, the newer fields of atomic energy, and other branches of high temperature technology, Sheffield University is to set up a degree of Batchelor of Technical Science in Refractories and Ceramics—the only one of its kind in the country.

NEW GASMETER diaphragm testing and research laboratory is to be opened shortly at the Great Harwood (Lancs) factory of the Metropolitan Leather Company, Limited, division of Parkinson Cowan, Limited. Equipment installed in the laboratory has been specially designed to eliminate the necessity for field trials.

DELEGATES from the International Ceramic Congress visited the works and central research laboratories of General Refractories, Limited, at Worksop last week. Before the tour the 30 delegates were entertained by the chairman of the company, Mr. R. A. Kirby, Mr. J. Gregory, managing director, and Mr. B. Eichler, technical director.

TWO BRITISH companies—Greengate & Irwell Rubber Company, Limited, conveyor belting manufacturers, of Manchester, and Conflow, Limited, makers of spray equipment, valves, etc., of Nottingham—have appointed the American subsidiary of Megator Pumps & Compressors, Limited, London, W.1, as their sole agents in the United States.

NEW DIVISION known as Site Shotblasting (Great Britain), Limited, has been formed by R. J. Richardson & Sons, Limited, engineers and shotblasters, of Birmingham. The division will take care of work which is too large to be transported to the parent works and its staff will be under the personal supervision of a site manager.

GENERAL REFRACTORIES, LIMITED, has installed plant at its Worksop works which enables 1,000 tons a day of raw materials to be unloaded at its sidings. The installation will facilitate the speedy unloading of rail wagons from the ports. The group, which uses 60,000 tons of chrome ore a year, is to charter its own ships to bring the raw materials from abroad.

AN UNUSUAL EXHIBITION—"Geology and Ceramics" opened this week at the Geological Museum, South Kensington, London. Arranged by the museum in conjunction with the British Ceramics Research Association it coincides with the International Ceramic Congress now being held in London. The exhibition remains on display for the rest of the year.

STEEL PRODUCTION in the United States this week is estimated by the American Iron and Steel Institute at 1,765,000 tons, compared with 1,870,000 tons last week and 2,653,000 tons in the corresponding week of last year. This week's estimated output in terms of January 1, 1960 capacity of 148,570,970 net tons, is 61.9 per cent. compared with last week's 65.6.

PRODUCTION AT THE NEW truck, engines and tractor factory units at Bathgate, Glasgow, of the British Motor Corporation, Limited, is expected to begin in 18 months and full production to be achieved in the first half of 1962. The new factory, which will cost £11,250,000, will have an annual turnover of about £50,000,000 and will eventually employ up to 10,000.

EXTENSION project, costing £3,000,000, is to be undertaken by Tubes, Limited, a subsidiary of Tube Investments, Limited, at its works at Desford, near Leicester. The capacity of the plant is to be doubled for the production of ball bearing and other heavy duty alloy steel tubes. Preparatory work on the scheme is already in hand and the project is scheduled to be completed in early 1962.

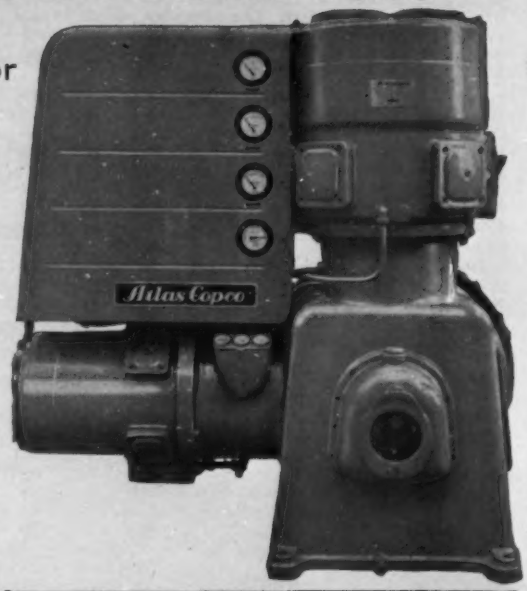
TO MEET the changing techniques in the steel industry, the West Hunwick Silica & Firebrick Company, Limited, is to carry out a £250,000 expansion scheme at its Crook (Co. Durham) works. Mr. J. R. Steel, the chairman, said that after the expansion is completed next spring the works, which employs 150 men, would have a potential output of 500 tons of basic material a week.

COMMITTEE has been formed by the Government of the State of Madras to study the possibilities of erecting a steelworks in southern India. At the same time the Tata Iron & Steel Company, Limited, of Jamshedpur, is assessing the potential use of brown coal from the local Neyveli deposits as a fuel base. Some 2,000 tons of the coal are to be sent to west Germany for testing.

FIVE-MAN deputation from the Monmouthshire Federation of Trades and Labour Councils was given an assurance by the general manager of the new Spencer steelworks of Richard Thomas & Baldwins, Limited, Mr. W. O. Campbell Adamson, that the works will pro-

Here's Air Power at ROCK BOTTOM cost

ER6 Heavy-Duty Compressor for reliable 3-shift operation



Atlas Copco's ER6 compressor delivers air at the lowest possible cost. Designed to incorporate *every* economy factor, it combines the lowest possible running costs with low installation costs and a space saving design.

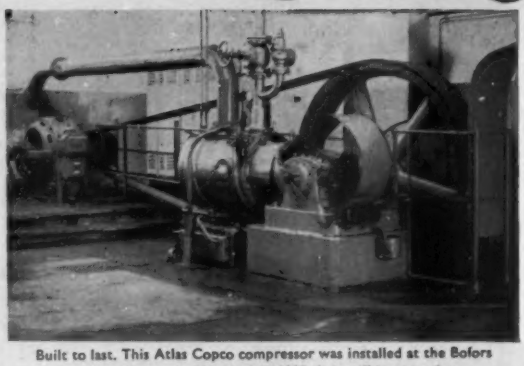
The ER6 delivers 1,075 cfm at 100 psi (30.4m³/min at 7 kg/cm²) for a power consumption that is absolutely rock bottom. Thanks to a new type of intercooler, water consumption is only 440 imperial gallons (2,000 litres) per hour—a *quarter* the consumption of most similar machines. The ER6 is compact. Occupying only half the space usually required for machines of its capacity, it saves expensive factory space. In addition, installation costs are lower as new, cheaper installation methods are employed.

RANGE OF STATIONARIES

From 2.5 to 20,000 cfm, there is an Atlas Copco stationary compressor to suit every requirement. Whatever the design factor—compactness, low installation cost, low operating cost, or a combination of all three—Atlas Copco stationaries are high-performance machines you can rely on.

Sales and Service in Ninety Countries

Represented in ninety countries, Atlas Copco is the world's largest organisation specialising solely in compressed air equipment. Products include stationary and portable compressors, rock drills, loaders, hoists, air tools and paint-spraying equipment. Wherever you are, the international Atlas Copco group offers expert advice and provides a complete after-sales service.



Built to last. This Atlas Copco compressor was installed at the Bofors engineering works (Sweden) in 1907. It is still in operation.

WRITE FOR THE LEAFLET Leaflet E1127 gives full details of the ER6 compressor. Write for a copy to your local Atlas Copco company or agent or to the address at the foot of this advertisement.

Atlas Copco

COMPRESSED AIR ENGINEERS

ATLAS COPCO (GREAT BRITAIN) LIMITED Maylands Avenue, Hemel Hempstead, Herts. Tel: Boxmoor 6040

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S/C8

vide equal opportunities for all school-leavers to compete for jobs. A special training centre is to be established within the works.

TO MARK THE golden jubilee of its formation as a public company, Lake & Elliot, Limited, steel and iron founders and makers of mechanical and hydraulic jacks, etc., of Braintree (Essex), has issued an illustrated brochure to shareholders. The company, which began as a bicycle shop in 1892 with four employees, now has 1,000 on its payroll. In 1955 it acquired National Steel Foundry (1914), Limited, Leven (Fife).

JOINTLY OWNED company is to be formed by Consolidated Zinc Pty., Limited, and Monsanto Chemicals Australia, Limited, to manufacture chemicals in which they have a common interest. The new company will be located at Monsanto's site in Sydney and will initially prodce the "Isceon" range of fluorcarbons which have previously been made by the Imperial Smelting Corporation, Limited, a member of the Consolidated Zinc group.

IN VIEW OF the continued rise in the cost of materials and labour J. H. Fenner & Company, Limited, power transmission engineers, of Hull, states that it is compelled to increase the prices of its Taper-lock pulleys by approximately 3 per cent. and Taper-lock couplings, Weld-on hubs, and adaptors by approximately 10 per cent. The increases became effective on Wednesday. Prices of the company's other engineering products remain unchanged.

MAJOR RECONSTRUCTION programme, due to expansion, is to be undertaken by Dowty Seals, Limited, a subsidiary of the Dowty Group, Limited. A new factory of modern design, using prefabricated steel sections, will be completed in 1961. Since all manufacturing operations will be carried out on the same level, with the consequent elimination of the handling problems experienced in the present factory, greater efficiency in production should be achieved.

INDIAN TRAINEES who will become foremen at the Durgapur steelworks in India have arrived in Sheffield and are working with local firms under the Colombo Plan. They will return to Durgapur in August to take up their posts. They are being instructed at the Darnal works of the Davy & United Engineering Company, Limited, the Park Gate Iron & Steel Company, Limited, Rotherham, and Steel, Peech & Tozer branch of the United Steel Companies, Limited.

Third Change for Newport's Oldest Steel Mill

FOR the third time in three years the ownership of Newport's oldest works has changed hands. Cordes Steel Mills, Limited (formerly Cordes (Dos Works), Limited), has been purchased as a wholly-owned subsidiary of E. L. Pitt & Company (Coventry), Limited, iron, steel, metal, and machinery merchants, of Birmingham. A new board of directors has been formed with Mr. E. L. Pitt as chairman and Mr. R. Fenwick as managing director. Mr. Keith Fenwick, a director, is to supervise the management of the Newport works.

The first take-over of Cordes came in 1957 when Pena Copper Mines, Limited, acquired the whole of the share capital of the company. In January, 1959, a Cardiff engineering firm, A. J. Seward (Engineering), Limited, purchased the works and changed the name Cordes (Dos Works) to Cordes Steel Mills. Founded in 1835, the works was built up on the manufacture of nails. Today, however, its main products are rails and steel re-rolling.

Scottish Coal Industry Will Soon "Turn the Corner"

THERE was no call for pessimism in the Scottish coal industry, said the chief scientific officer of the Scottish Divisional Coal Board, Dr. Eric A. C. Chamberlain, speaking in Dunfermline recently. He felt that the future development of the coal industry now planned was adequately justified and he believed that the manpower requirements of the National Coal Board would be maintained and probably increased.

Dr. Chamberlain forecast that the present crisis would last a little longer, but that in 10 to 18 months' time they would turn the corner. With the expansion in Scotland there were fresh demands for coal and the new industries would be able to use new chars from non-coking coal supplied by Scotland. The need for smokeless fuels in Scotland was a factor requiring adjustment. At present the NCB was working on a plan to produce 500,000 tons of this fuel in Scotland, but a site had not yet been chosen.

On the subject of the synthesis of coal, Dr. Chamberlain said that Britain, unlike Germany and the USA, had been slow in its development. The new Lurgi plant at Westfield (Fife) could be developed into a system of oil extraction over a period of 10 to 15 years. Although the possibilities of this process were most interesting, it would be foolish to count too much on coal by-products—for these were likely to be limited.

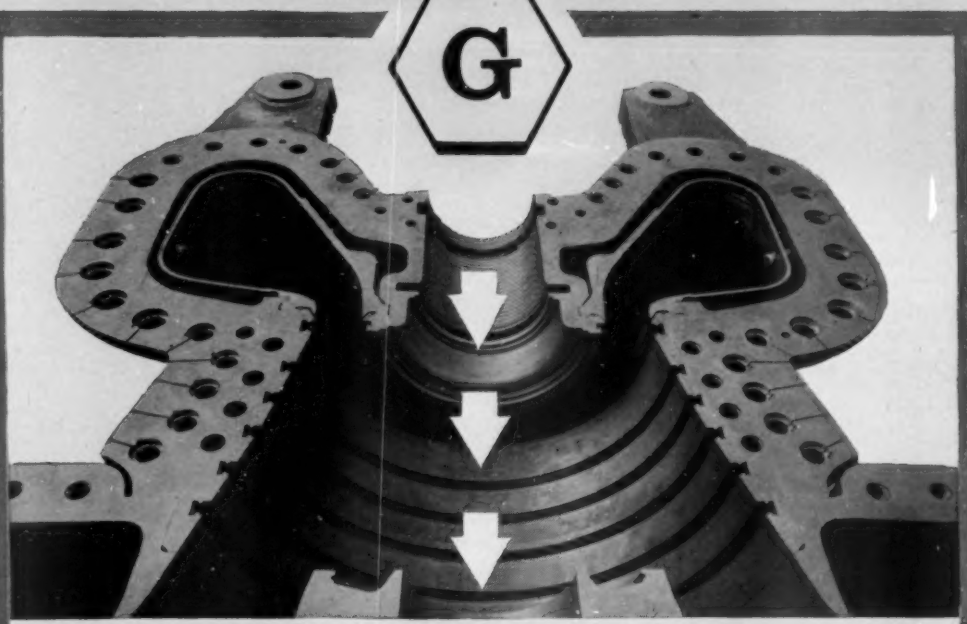
Yorkshire Deputies Told: "Don't Lose Heart"

URGING the 7,600 members of the Yorkshire area of the National Association of Colliery Overmen, Deputies, and Shotfirers, not to lose heart, but to allow their representatives to try to consolidate the present position, the retiring general secretary, Mr. Eric Lockett, said that conditions were not favourable for a wage increase in the immediate future. "We may be passing through a very disturbing phase in the industry at the moment," he continued, "but I am confident that if everyone pulls together we shall come out all right."

The Yorkshire Area of the association was now in a very strong financial position, with assets the highest in its history, and in the near future, Mr. Lockett believed, the association would own its own offices—something which had always been regarded as a "pipe-dream." He went on to criticize the abuse which some members made of the sickness and accidents agreement and said that while only a few did so they made things difficult for their colleagues.

Mr. Lockett is leaving the association to take up a position with the National Coal Board and, reviewing his 10 years of office as secretary, the Area president, Mr. William Levitt, said that Mr. Lockett had done much to streamline the operation of the association and had been a gallant fighter for it.

MINERS AT Upton Colliery (Yorks) returned to work on Monday after a nine-day-old pay dispute. Men at South Elmsall and Frickley collieries who came out in sympathy with Upton returned to work on Saturday. Markham Main men who also came out in support of Upton returned to work last Friday.



This is the lower half of a gas turbine cylinder for a 2,500 kW gas turbo-alternator now running in a Midland steel works, converting the heat in waste blast-furnace gas into useful work. The provision of economical power is our business; and since we manufacture most of the main equipment for a power station such as boilers, turbines, alternators, condensers, feed heaters, cooling-water strainers, we are well equipped to design and carry through schemes for the efficient utilisation of any fuel.

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THE NORTH EASTERN MARINE ENGINEERING CO. LTD. — RICHARDSONS WESTGARTH (HARTLEPOOL) LTD.
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CURRENT PRICES OF IRON AND STEEL

(Delivered, unless otherwise stated)
June 2, 1960

PIG-IRON

Foundry and Forge Iron.—No. 3 iron, Class 2, Middlesbrough, £21 6s.; Birmingham, £20 18s. 3d., 10-ton lots or over.

Low-phosphorus Iron.—Over 0·10% to 0·40% P, 10-ton lots or over, £23 5s., delivered Birmingham, £23 10s., delivered Grangemouth.

Basic Pig-iron.—Delivered in Staffs, Derbyshire, Notts, Linca, Rutland, Northants, and Leics, 10-ton lots or over, £20 3s.

Hematite.—Si up to 2%, S & P 0·03-0·05%: N.-E. (local iron), £23 19s.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 7s. 6d.; Birmingham, £25 14s.; Wales (Welsh iron), £23 19s., 10-ton lots or over in each case.

Refined.—Cylinder and refined irons, South Zone £25 9s., North Zone £25 6s. 6d. Refined malleable, max. 0·10% P. South Zone £26 9s., North Zone £26 6s. 6d.

MANUFACTURED IRON

(Bar basis, 2½ in. to ¼ in.)

CROWN IRON: England and Wales (Zone 1), £48 10s.; Scotland, £48 5s.; Ireland, f.o.q. Belfast, £50 7s. 6d.; all other Northern Ireland ports, £50 10s., f.o.q. Cable iron, £1 extra.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., 100 tons and over, £31 15s. 6d.; tested, 0·08-0·33% C, 6 to 35 tons, £33 15s. 6d.; hard (0·41-0·60% C), under 10 tons, £34 17s.; silico-manganese, under 10 tons, £43 16s. 6d.; free-cutting steel up to 0·25% C, under 10 tons, £36 14s. 6d. SIEMENS-MARTIN ACID (under 10 tons): Up to 0·25% C, £41 1s.; silico-manganese, £44 4s.

Billets, Blooms, and Slabs for Forging and Stamping.—Lots of under 10 tons. Basic, soft, up to 0·33% C, £38 10s.; basic, hard, over 0·41 up to 0·60% C, £39 12s. 6d.; acid, up to 0·25% C, £43 4s.; acid silico-manganese, £46 7s.

Alloy Steel (5 tons to under 10 tons).—BILLETS, 3 in., up to and including 10 in., for re-rolling, 0·6/1% Ni, £47.; Ni 2·75/3·75%, Cr 0·5/1·10%, £73 17s.; Ni 2·75/3·75%, Cr 0·5/1·3%, Mo 0·2/0·65%, £84 7s. BARS: 1 in. dia. and up, nickel, £67 17s.; nickel-chrome, £98 11s.; nickel-chrome-molybdenum, £111 4s.

Other Semi-products, etc.—Forging ingots, up to 0·60% C, £31 12s. 6d. f.o.t.; tube billets, under 10 tons, £40 10s.; shell steel billets for direct forging up to and including 0·33% C, 100 tons and over, £37 15s.; tin bars and sheet bars, 50 tons and over, £32 10s. Wire rods, 3g. to 4g. (all areas except Birmingham, Scotland, Southern Joint Area, and Northern Ireland): Soft basic, under 50 tons, £41 2s.; hard basic, under 10 tons, £44 8s.; free-cutting, up to 0·25% C, under 10 tons, £46 12s.; acid, up to 0·75% C, under 10 tons, £54 14s. 6d. Stainless steel billets, 3 in. and over, 5 tons to under 10 tons, Austenitic, £229 10s.; martensitic, £141 10s.

FINISHED STEEL

Heavy Products (1 ton to under 10 tons).—Mild-steel plates, ordinary qualities, N.-E. Coast and Northern Joint Areas and Central Scotland, £41 12s.; medium plates, all areas of England and Wales, £45 1s. 6d.; boiler plates, N.-E. Coast and Northern Joint Areas and Central Scotland, £44 2s.; floor plates, N.-E. Coast, £43 1s. Sections (N.-E. Coast, Midland, and Northern Joint Areas, and Central Scotland): Angles, £38 16s. 6d.; bars (rounds and squares), £41 6s. 6d.; flats, £39 1s. 6d.; joists, £38 12s. 6d.

Rolled and Re-rolled Steel Products.—N.-E. Coast, Midland, Northern Joint, and South Wales Areas, and Central Scotland, 50 tons and over: Angles and tees, 4 in. and under, £40 18s. Channels, 3-in. web and under, £40 18s. Flats, 5 in. wide and under, and rounds and squares, under 3 in.: Untested soft basic, £39 1s.; free-cutting, £45 1s. 6d.; hard basic, £41 19s. 6d.; Siemens-Martin acid, £49 0s. 6d.; spring steel, basic, £44 4s. 6d.; spring steel, acid, £52 19s. Glazing tees, £47 0s. 6d. Sash and casement sections, £43 13s. 6d. Gate channels, £50 17s. 6d. Ferro-concrete bars (10 tons to under 500 tons), £39 10s.

Sheets and Strip.—Uncoated strip mill coils, hot rolled, under 3 mm. to 12g., mill run, mill edge, 25 tons to under 50 tons, £43 16s.; cold reduced, 17/20g., side trimmed, skin passed, £49 16s. Black sheets, 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £68 5s. Cold-rolled steel strip, coils, hard temper, not annealed, 10 tons to under 20 tons, £55 5s. Hot-rolled hoop and strip, u/t soft basic, 100 tons and over, £38.

Tinplates.—Cold reduced, hot dipped, 15 tons to under 50 tons, 66s. 8d. per basis box of 108 lb., f.o.t. makers' works. Cold reduced electrolytic, 59s. 9d. per basis box.

Colliery Rails and Arches.—Arches, 4 in. × 2½ in. × 2 in., re-rolled £39 15s., 3 in. × 3 in., re-rolled £40, 3½ in. × 3½ in., re-rolled £40 7s. 6d., 4 in. × 2½ in. × 2 in., prime £44 6s. 9d. Other sections, prime £44 11s. 9d. Extra fishplates, £52 10s. Cambered girders, 4 in. × 2½ in. × 2 in., re-rolled £38 9s., 3 in. × 3 in., re-rolled £38 11s. 6d., 3½ in. × 3½ in., re-rolled £38 18s. 6d., 4 in. × 2½ in. × 2 in., prime £43 4s. Other sections, prime £43 6s. 6d. Benk bars, standard type, prime material, all thicknesses, £38 11s.; re-rolled, up to ¾ in., inclusive, £37 6s.; over ¾ in., £38 11s. "W" type bars, prime steel, all thicknesses, £41 1s.; re-rolled, up to ¾ in., inclusive, £39 16s.; over ¾ in., £41 1s.

Bright Steel (10 tons to under 20 tons).—Bars, no analysis or test, £52 8s. 6d.; flats, untested, £70 3s. 6d.

High-speed Tool Steel.—Finished bars, 5% cobalt, 10s. 10d.; 14% tungsten, 6s. 11d.; 18% tungsten, 7s. 9d.; 22% tungsten, 9s. 2d.; 4/6 quality molybdenum tungsten, 6s. 3d.; 6/6 quality molybdenum tungsten, 6s. 5d.; 5/6/2 quality molybdenum tungsten vanadium, 6s. 7d. per lb.

Rails, etc.—F.B. rails, heavy, 75 lb. to under 90 lb., 500 tons and over, f.o.t., £39 15s.; fishplates for rails 80 lb. and over, 50 tons and over, f.o.t., £53 11s.; soleplates, f.o.t., 100 tons and over, £51. Light flange rails, 25 lb. and under, d/d N.-E. Coast, Midland, Northern Joint, and South Wales Areas, and Central Scotland, 50 tons and over, £40 17s. 6d.; fishplates for light rails, 50 tons and over, £50 12s. 6d.

BLAST-FURNACE COKE

(F.O.T. at Ovens)

DURHAM AND NORTH-EAST COAST: 159s. 3d. SOUTH WALES: 158s. NOTTS AND DERBY: 135s. 5d. LANCASHIRE: 146s. STAFFORDSHIRE: 139s. 5d. YORKSHIRE: 138s. 8d. SCOTLAND: 169s. 4d.

(All prices are subject to quality differentials.)

STEELWORKS SCRAP

(Plus 5 per cent. in the case of sales by merchants.)

	Scotland.	N.-E. Coast.	Midlands.	Sheffield.	Lancs.	S. Wales (East)	S. Wales (West)
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Heavy steel scrap* ..	229 3	228 3	220 0	226 3	226 3	227 3	232 3
Heavy mixed scrap*	207 3	206 3	198 6	204 3	203 9	205 3	210 3
Heavy steel turnings†	179 9	179 9	169 9	176 9	174 3	177 0	180 0
Heavy cast iron†	206 9	203 9	208 0	204 3	189 3	199 3	205 9
Cast-iron borings†	160 3	157 3	157 0	159 9	157 3	159 6	164 6

* Basis 500-ton lots in England and Wales and 250 tons and upwards in Scotland, delivered.

† Not less than 250 tons in England and Wales, 100 tons in Scotland.